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PARKING MANAGEMENT STUDY  
(emphasizing Suburban Areas)

PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT  
SACRAMENTO COUNTY, CALIFORNIA

Review Draft

June 1980

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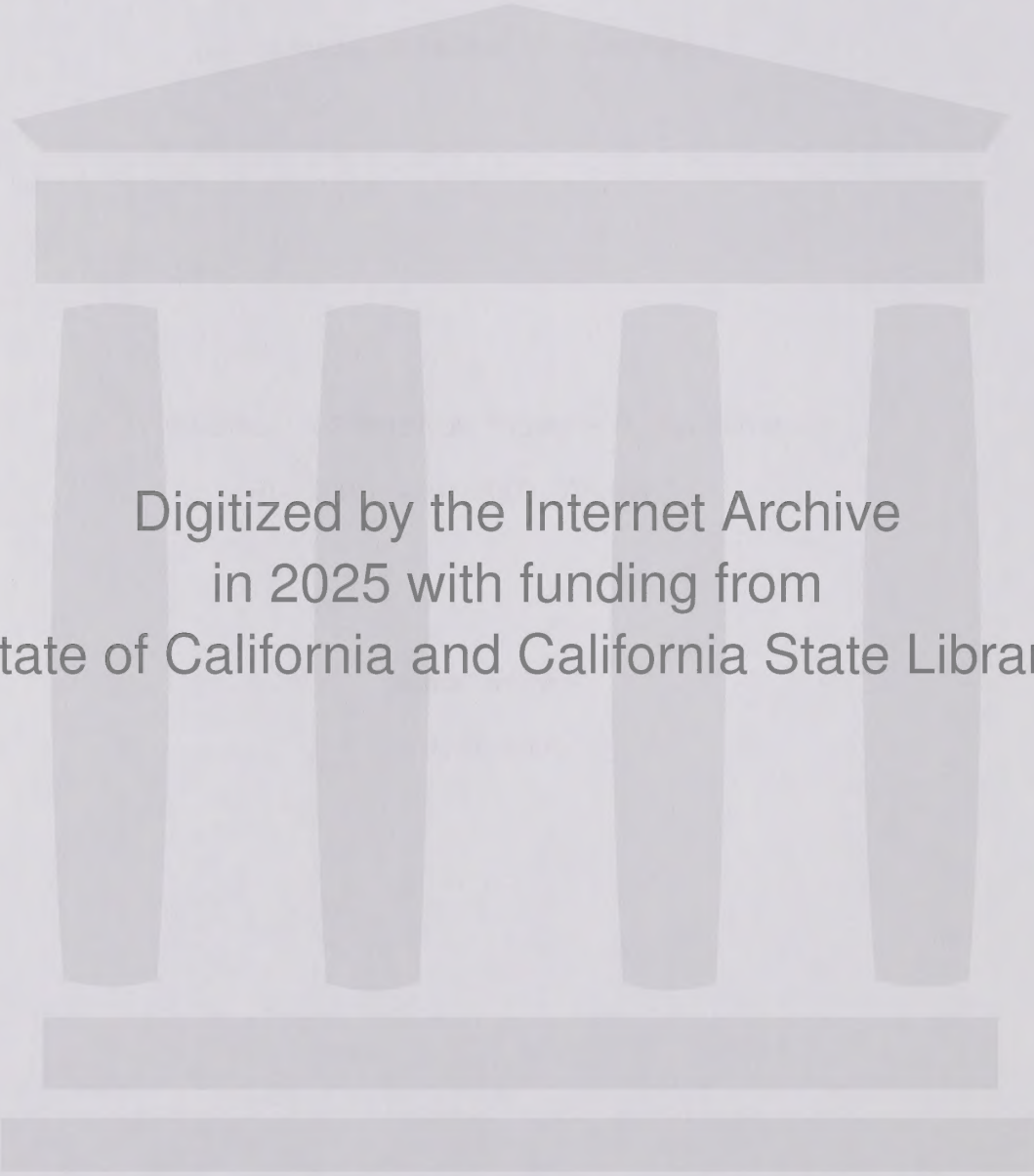
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## CHAPTER I

### PARKING, TRANSPORTATION, AND AIR QUALITY

The purpose of this study is to develop parking policies, programs, and regulations which will lead to a measurable improvement in air quality. Yet, as with most such simple statements, there exists an underlying complexity of issues which challenge simple solutions. Automobile parking is but one component of one particular mode of travel in a large transportation network, the character of which is defined by millions of individual trip-making decisions. In order to properly address the issue of parking controls, we must endeavor to gain some insight into the nature of transportation in the Sacramento region and its interrelationship with national air quality and energy goals.

#### Air Quality

In the face of strong evidence that high levels of certain air pollutants were a definite health hazard--particularly for the very young, the aged, and those with respiratory problems--Congress in 1977 passed the Clean Air Act establishing national ambient air quality standards for specified pollutants. Congress later extended the deadline for achieving these goals to, in effect, 1987 for the Sacramento air basin (Sacramento, Yolo, parts of Placer and Solano Counties) and required that the governments in the basin adopt a plan to achieve the standards by that date and make reasonable further progress towards implementing them along the way. The penalty for non-compliance: loss of specified federal funding (the sewer grant, transportation funds) and a moratorium on major new industry licensing. The City and County of Sacramento approved the Air Quality Plan in December 1978.

Oxidants and carbon monoxide (CO) are the primary pollutants in the Sacramento Region, annually exceeding the federal standards on several days each year. Basic differences between these two pollutants necessitate different approaches to limiting their impact. Oxidants, the photochemical smog which limits visibility and irritates the eyes and lungs, are produced in a complicated sequential chemical reaction involving nitrous oxides (NO<sub>x</sub>) hydrocarbons (THC), and sunlight. There consequently is considerable diffusion of the oxidants in the atmosphere, making oxidant levels more regionally uniform than localized in concentration. Experimental evidence based on smog chamber research suggests that, given the typical oxidant concentrations in the Sacramento Region, strategies focusing on THC emission reductions may be more effective in limiting photochemical smog. Consequently, the calculated emission reductions in the Air Quality Plan are based on THC. Also, since the main source of NO<sub>x</sub> and THC is the motor vehicle, which in 1976 contributed an estimated<sup>x</sup> 60% of the NO<sub>x</sub> and 55% of the THC emissions in the Sacramento Region, strategies directed at limiting auto use and emissions will likely achieve comparable reductions in both pollutant emissions.

Carbon monoxide, by contrast, is a primary pollutant which can directly induce toxic effects in high concentrations. Over 80% of the CO emissions in the Region come from motor vehicles, and CO concentrations are expectedly higher along major roadways. Given this more localized character of CO, control strategies can be more narrowly applied, for example, by providing for sufficient building setbacks from major roadways to ameliorate CO impacts, and by site and building design which does not contribute to the excessive buildup of CO concentrations. Of course, any significant reduction in vehicular use will also contribute significantly to CO emission reductions.



The Air Quality Plan adopted by the City and County of Sacramento establishes an overall goal of reducing THC emissions by 51 tons/day, from a 1976 estimated total of 95.7 tons/day to a 1987 level of 44.7 tons/day. This would be accomplished as follows:

<u>Reduction</u>	<u>Volume Tons/Day</u>	<u>% of Total</u>
Emission controls on newer vehicles	26.5	52%
Other motor vehicle emission reductions	11.0	22%
Point, and area source reductions; aircraft and off highway vehicle emission reductions	13.5 51.0	26% 100%

The large reductions attributable to emission controls on new vehicles are the result of existing strict federal and state automobile emission controls which, over time, will have an increasingly greater impact as newer, cleaner cars replace older autos in the regionwide vehicle fleet. However, predicted growth in the number of vehicles and the miles they travel (VMT) tend to offset the gains achieved by vehicular emission reductions. In the way of new measures, the Air Quality Plan proposes a wide array of stationary and other vehicular source controls to the point of virtually exhausting the potential for significant further reductions in that category and raising complaints of equity from industry officials that an unreasonable burden is being placed on the private sector when automobiles are the primary culprit. It is therefore necessary that the City, County, and State consider strategies limiting that most politically sensitive of issues, private automobile use.

#### Approaches to Automobile Emission Reductions

A brief discussion of the various approaches to achieving reduced automobile emissions provides a better understanding of the range of available measures and how parking control strategies fit into the overall scheme. We can identify seven basic approaches to reduced emissions, each with a number of specific measures. They are summarized in Table I-1, together with the amount of reductions which have been credited to them in the Air Quality Plan prepared by SRAPC. We caution that care be taken in the use and reference of these values; on a continuum ranging between empirically determined absolutes and wild guesses, they tend to fall towards the latter end of the scale. They are best used to indicate the appropriate order of magnitude of anticipated emission reductions for the Region.

Increase Vehicle Efficiency. These measures are supplementary to existing auto emission standards, which will account for a large part of emission reductions over the next seven years (see above). The principal measure is a motor vehicle inspection and maintenance program, which requires yet-to-be forthcoming state authorization. An annual inspection program would help keep smog controls on engines in proper operating condition, with a corresponding major impact on hydrocarbon emissions.



TABLE I-1  
1987 EMISSION REDUCTION TARGETS  
FOR ON-ROAD MOBILE SOURCES

Control Measures	THC Reduction Tons/Day	% of Motor Vehicle Emission Reductions
<u>MEASURES TO INCREASE VEHICLE EFFICIENCY</u>		
a) MVIMP	3.73	34.5%
b) Voluntary Retirement of Older Vehicles	.48	4.4%
c) Increased Trucking Efficiency	.10 / 4.31	.9% 40.0
<u>MEASURES TO DECREASE NUMBER OF ALL TRIPS</u>		
a) Growth Limitation	.83	
b) Trip Reduction Program	.83	
c) Auto Free Zones	.04	
d) Peak Hour Congestion Pricing	.03	
e) Triple Trailer Trucking	.12	
f) Auto Operating Cost Increase	.02-.06	
g) Increased Piggy-Backing by Rail	.02	
h) 18-Year-Old Licenses	.89 / 2.78	26.1%
<u>MEASURES TO DECREASE LENGTH OF ALL TRIPS</u>		
a) Development Policies	.62	
b) Development Mitigation Measures	.02 / .64	5.9%
<u>MEASURES TO INCREASE VEHICLE OCCUPANCY</u>		
a) Ridesharing	.64	
b) I-80 Bypass Study	.02-.10	
c) McClellan AFB	.02	
d) Increased Use of Air/Rail/Bus	.06 / .74	7.6%
<u>MEASURES TO INCREASE TRANSIT RIDERSHIP</u>		
a) Regional Transit General Plan (RTGP) (including fleet expansion, park-and-ride, signal preemption, and preferential lanes)	.25	
b) Parking Strategy	.06	
c) Subsidized Bus Passes	.04	
d) Education Programs	.04	
e) Distribution of Bus Passes to Home Buyers	.21 / .60	5.5%
<u>MEASURES TO INCREASE USE OF ALTERNATIVE TRANSPORTATION MODES (other than the auto &amp; RT)</u>		
a) Pedestrian Controls/Bike Incentives	.06	
b) Electric Vehicles	1.31 / 1.37	12.7%
<u>MEASURES TO IMPROVE TRAFFIC FLOW</u>		
a) Traffic Signal Synchronization	.06	
b) Expand Capacity & Flow on H-W Network	.12	
c) Congestion Relief	.04	
d) Ramp Metering/HOV Lanes	.02 / .24	
e) Flextime - 4/40 Work Week	Tied to Ridesharing	2.2%
TOTAL	10.8	100%

Source: Addendum. Emission reduction targets for transportation control measures.  
SRAPC. Dated 9/11/79.



Decrease the Number of All Trips. With the exception of growth limitation, these measures are directed at encouraging people or companies to make fewer trips. Growth limitation means the conscious attempt to make the rate of growth below predicted levels, thereby slowing the rate of increase in the number of trips made. Triple trailer trucking, auto operating cost measures, increased rail piggy-backing and 18 year-old licenses are beyond the ability of local agencies to implement. Peak hour congestion pricing (toll charges for freeway use) has been rejected by the City and County of Sacramento as infeasible and probably illegal.

Decrease the Length of All Trips. Measures under this heading basically comprise planning efforts to locate new development as close as possible to employment and service centers so as to reduce the length of work and shopping trips from what they would be if assuming normal development practices.

Increase Vehicle Occupancy. Expanded ridesharing participation through expanded state and McClellan AFB ridesharing programs forms the cornerstone of this approach to emission reductions. The I-80 Bypass Study recommends high occupancy vehicle lanes as one alternative for the Bypass Corridor, hence, its inclusion here.

Increase Transit Ridership. Although usually the first strategy which comes to mind when considering transportation controls, transit ridership increases account for a surprisingly small percentage of mobile source emission reductions, according to SRAPC's calculations. Many feel that a greatly expanded bus system can contribute more significantly to the 5% estimate included in the Air Quality Plan. Measures consist of both physical improvements in the bus system as well as a combination of incentives for bus use and disincentives for auto use.

Increase Use of Other Alternative Transportation Modes. The bulk of reductions in this category are attributable to the conversion of large governmental and other car fleets to electric vehicles. Pedestrian controls and bicycle incentives would lead to relatively small reductions.

Improve Traffic Flow. These measures are based on the notion that increased transportation system efficiency--less stop-and-go traffic, idling time and the like--will result in less emissions. However, since expanded highway capacity tends to be growth inducing, and since funds for road improvements are diminishing, measures under this category must be carefully implemented.

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#### Transportation, Air Quality and Energy

In addition to Air Quality, there exist two other major problems of local, state and national significance--energy and transportation. The inter-relationships between these three problems are direct and obvious. In most cases, strategies for dealing with them are mutually supportive.



Reducing this country's dependence on imported oil is a national goal of the highest priority. While technological alternatives to petroleum fueled engines may be widely employed in the future, there is no alternative in the short term but to conserve fuel--and this means driving less. Thus, strategies to reduce vehicle miles travelled by encouraging fewer trips, shorter trips, or use of alternative transportation modes are all supportive of national, state, and local energy conservation goals.

Traffic congestion is a problem common to most metropolitan areas, and Sacramento is no exception. Traffic levels on both surface roads and freeways have been increasing at rates of up to 10% annually, and are expected to steadily increase as the Region continues to grow. Traffic problems are likely to be most acute in the northeast area. During peak periods, I-80, U.S. 50, and Fair Oaks Boulevard are presently operating at or near capacity and can accommodate only a slight increase in traffic demand. Moreover, the County Public Works Department expects congested conditions to worsen at intersections presently experiencing congestion and to develop at 40 additional intersections in the unincorporated area over the next 10 years. In the absence of any major system expansion, it seems clear that we can expect increased traffic during the 1980's to cause severe congestion, subsequent delays, and the lengthening of the peak period of congestion.

Again, measures outlined previously which would discourage private automobile use will also, if implemented, reduce the scope and severity of traffic problems in Sacramento and lessen the need for major highway system expansion with its attendant high costs and major adverse impacts. The degree that congested stop-and-go driving can be avoided also minimizes the additional pollutant emissions associated with the less efficient fuel combustion of idling engines.

The essential point that needs to be stressed here is that our dependence on the automobile has led to major air quality problems, energy vulnerability, and severe traffic congestion. Any inducements which encourage us to develop a more circumspect and restrained relationship will contribute towards the resolution of not one, but all three of these major issues. This raises accordingly the priority of responsible governmental action to provide such inducements.

#### The Role of Parking

Since parking is an essential component of almost all trips by automobile, it is reasonable to assume that the management of parking supply so as to make parking more difficult or costly can induce trip makers to make fewer automobile trips. If it is consistently difficult for a person to find a place to park near his destination, then he may find it worth his while to take the

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\* SRAPC. Interstate 80 Multi-Modal Corridor Study. Study Report. July 1979, page 32.

\*\* Sacramento Regional Transit: Folsom Corridor Rail Transit Feasibility Study, Land Use Transportation; Present and Future. October 1979, page 63.

bus. If parking costs increase substantially, then automobile drivers will reweigh the cost/benefits of auto vs. other modes of travel and may opt for other modes. The circumstances under which these change-of-mode decisions are made, however, vary considerably from individual to individual and community to community. Much effort has gone into developing models to predict the likelihood or elasticity of driver response to these and other variables which influence choice of mode. It should be noted that motorists are very resourceful at finding ways to circumvent parking controls and fees. Often attempts to regulate parking result in more problems than they solve; consequently, care must be taken in developing appropriate parking management measures.

There are other less obvious ways in which the design and management of parking can conceivably influence air pollutant emissions. Good parking lot design--with adequate driveways, sufficient "stacking" capacity, good circulation, and stall layout to facilitate easy parking--promotes the efficient movement of vehicles, thereby minimizing idling time and air pollutant emissions associated with stop-and-go driving. The proliferation of drive-up windows at banks, restaurants, and photoprint stores lends importance to the relative impact on air pollutant emissions of drive-up vs. park-and-enter service. Parking lots which are designed with pedestrians in mind; which provide for convenient, safe, and secure bicycle parking; and which incorporate bus shelters, turnouts, and other transit amenities may promote the use of alternative transportation modes. Parking management policies which link parking charges with programs to subsidize monthly bus passes are yet another such inducement. Finally, well-chosen, convenient parking is the essential link in such change-of-mode strategies as park-and-ride and the development of car-pooling staging areas, while preferential parking at the destination is an important inducement to the use of such strategies.

Identifying effective, equitable, and acceptable alternatives from the many potential supply/pricing strategies is the major focus of this report, but throughout this report it is essential to bear in mind that parking control strategies are not the cornerstone of VMT reduction programs, but only one element of an overall package of strategies to reduce automobile use. If parking and supply disincentives are to be effective, there must be alternatives to the existing peak-period use of overcrowded roads.

#### Other Parking Issues

Air quality is the primary but not the only stimulus for this study. Other parking-related issues which require attention concern the adequacy of existing standards in view of presentday parking demand, and the role of landscaping in parking lot design.

Parking Demand. Municipal parking requirements should closely approximate the expected parking demand for different types of uses so as to avoid the undesirable consequences of either excessive or insufficient available parking. Presently, Sacramento County uses parking requirements based on ten-year-old standards developed by various other jurisdictions. For this and other reasons, some code requirements are problematic. For example, neighborhood and community centers occasionally provide two to three times the amount of parking normally demanded. On the other hand, particularly high demand at various hospitals, office complexes, and several large banks has led to spillover parking into nearby neighborhoods, to the displeasure of those residents who must contend with congested on-street parking.



Another parking problem encountered in planning review concerns multiple tenant developments in commercial and industrial developments. Oftentimes development plans are approved based on one expected use--say warehousing operations--which is not parking intensive, but the actual uses are dominated by retail stores, which generate more traffic and create a parking problem.

Finally, the considerable variability occasionally encountered in parking demand among different establishments of the same use category raises a basic question regarding parking requirements based on observed demand: Is variability in demand sufficient to warrant a more flexible approach to setting requirements?

These problems, together with the fact that a knowledge of the actual amount of parking spaces required for different uses is requisite to an understanding of the potential for limiting parking supply suggest the need to undertake a thorough effort to assess parking demand for key use categories and develop parking requirements based thereon.

Landscaping and Aesthetics. Landscaping is a key element of parking lot design. The intelligent use of landscaping can substantially add to visual amenity, lower ambient summer temperatures, screen adjoining uses, channel pedestrian movements, and improve the microclimate. However, Sacramento County requires only 5% landscaping in parking lots and does not set forth any criteria or standards to promote the kind of landscaping which realizes its beneficial potential. The result is numerous parking lots throughout the County with standardized layout and design which provide little or no screening, shading, or aesthetic enhancement.

## CHAPTER II

### DETERMINING PARKING DEMAND

Parking demand can be defined as the vehicle accumulation which occurs at any time at a given site. The three basic determinants of that accumulation are: (1) the number of vehicles attracted to the site, (2) the length of stay of the vehicles, and (3) the time pattern of vehicle arrival.<sup>1</sup> For purposes of this study, the most important subset of general parking demand is "peak" demand, or the peak vehicle accumulation which occurs regularly at a given site. It is that regularly occurring peak demand which establishes a "baseline" need for parking facilities at specific locations.

Numerous factors can affect parking demand as a result of their affects on any of the three determinants of vehicle accumulation mentioned above. Those factors affecting demand include: (1) land and building use, including size; (2) accessibility to alternative transportation modes; (3) traffic access; (4) parking facility congestion; (5) parking supply shortages; (6) parking cost; (7) population and community characteristics, including family size and age distribution, household income, car ownership, cost and availability of fuel, and labor force participation rate.<sup>2</sup>

The difficulty in isolating each of these factors for any given site is obvious. Many of the factors are closely interrelated and dynamic; each site is unique in terms of each of the demand factors. These site-specific differences contribute to the variation in parking demand for similar businesses at different locations.

Because of the difficulty in isolating the various demand factors, most studies of suburban parking demand focus on differences between land use categories; other factors (density of development, population distribution, socioeconomic characteristics, and access to other modes of transportation) are generally considered to be similar within a given municipality. Parking costs, congestion, and supply shortages can be minimized as factors in a suburban parking demand study by selecting sites for observation which have an obvious abundance of free parking.

With respect to the Sacramento metropolitan area, a basic difference exists between the character of parking in the suburbs and in the central city, a difference which corresponds to the different character of development. The central city, with relatively high land costs, developed at a higher density with little free off-street parking. Off-street parking is typically provided for a fee in private or city-operated surface lots or parking structures; on-street parking in the core area is generally time-limited and metered, as it is in other portions of the central city outside of the core where high-density commercial, office, and medical buildings predominate. As a result of the high density development, bus service has historically focused on the central city area, specifically the core.

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<sup>1</sup>Eno Foundation for Transportation, Zoning, Parking, and Traffic, p. 76.

<sup>2</sup>Highway Research Board, Special Report No. 125, Parking Principles, pp. 16-18.



In contrast, initially lower land costs have resulted in lower density development in the suburbs. Commercial and office buildings are generally single-story, and seldom over two stories in height. Free off-street parking has historically been provided by the developer, and, in fact, institutionalized by zoning requirements. On-street parking is typically prohibited on major streets. Because of the low-density, dispersed nature of commercial and office development in the suburbs, bus service is considerably less efficient than in the central city.

It is this difference between central city and suburb that necessitates the use of different approaches in determining parking demand. Our concern here is with determining parking demand in a suburban setting, where demand by land use category can be isolated.

### Parking Demand in Suburban Sacramento County: A Case Study

Study Methodology: Parking demand in the suburban areas of the City and County of Sacramento was determined by an extensive field survey, conducted between mid-October and mid-November, 1979. Prior to undertaking the mechanics of the field survey, several preliminary steps were necessary. Those steps included: (a) establishing a reasonable approach to use in the field; (b) determining which land use categories to survey; (c) selecting which sites to survey in each land use category; (d) gathering needed information relative to each site, including hours of peak parking demand, number of employees, and gross floor area; and (e) scheduling the field work in accordance with the approach established in step (a). Once the preliminary steps were completed, the field counts were conducted, and the resulting data was tabulated and analyzed.

(a) Selected Approach: In brief, the approach selected for the field survey was to determine the parking demand for different land use categories by counting the number of cars parked at various sites within each category at appropriate (instantaneous) times.

Working within established constraints of time (we recognized the necessity of completing the field work prior to the onset of the Christmas shopping season) and staff/vehicle availability, we concluded that we could get a better picture of the parking demand for more land use categories if we concentrated our field counts during known or estimated peak parking periods at the selected sites; we could include more sites within each category, thereby getting a better range in terms of facility size and location.

The alternate approach, which we rejected, would have entailed day-long counts at each site (i.e., count each parking lot every fifteen or thirty minutes) to insure that the peak accumulation would be counted. Obviously, such an approach would have necessitated a significant reduction in the number of sites surveyed and the number of days each site was surveyed.

In summary, we chose to include as many sites as feasible in as many categories as feasible by taking care in the survey design to concentrate the field counts during estimated or known peak use periods. Numerous additional counts were made during other reasonable periods of time as "insurance" against missing an actual peak, should estimated peaks have proven erroneous.

By survey's end, we had counted the cars in parking lots at 215 "good" sites (after deleting "problem" sites from the tabulations) in 18 different categories. We made a total of 4,446 counts, an average of 20.7 counts per site--so we have a very large sample size for use in determining parking demand and ultimately establishing parking standards.

(b) Land Use Categories: The land use categories included in the survey were chosen on the basis of two primary criteria: those categories where the planning staff has suspected present zoning standards to be either excessive or insufficient; and those categories where we might expect to have the greatest impact in terms of future development. Some rearrangement of the categories was done for analysis purposes at the conclusion of the field work. For example, "banks" and "savings and loans" were considered in a single category at the outset of the field work; discussions with some managers of financial institutions coupled with our initial field perceptions, however, led us to separate the fourteen financial institutions which we surveyed into two separate categories for purposes of analysis.

Parking demand was analyzed for seventeen basic land use categories. An eighteenth category, recreational facilities, included too few sites of any one type to analyze (two golf courses, two bowling alleys, two racquetball courts, and two health spas); we went ahead and surveyed the sites, though, in hopes of gaining insights that would prove useful in any future site plan review applications. A brief description of each land use category follows:

Neighborhood and Community Shopping Center: a facility with more than one retail sales outlet, including a major grocery store.

Mixed Retail: a facility with more than one retail sales outlet, not including a major grocery store.

Single Retail: a retail sales outlet that is not a part of a mixed-use development and is not in any other specific category included in this study.

Medical-Dental Buildings: any office or office complex containing exclusively medical and/or dental facilities, not including hospitals or other acute-or extended-care facilities.

Banks: self-explanatory.

Savings and Loan: any savings institution other than a bank.

Business and Professional: any office or office complex for business or professional tenants that is not in any other specific category included in this study.

Fast Food Restaurant: a restaurant which may or may not have seating, where food orders are rapidly prepared and may be easily carried out.

High-Volume Sitdown Restaurant: a restaurant with a high patron turnover, typically with a service counter, open throughout the day and often 24 hours.

Dinner Restaurant: a restaurant with a lower patron turnover, generally specializing in lunch and/or dinner, and frequently including a cocktail lounge.

Furniture Store: a retail sales outlet selling furniture and/or large household appliances.

Building Supply: a retail facility where lumber and other building materials are sold, which includes a storage yard (uncovered or covered) as well as a retail building.

Auto Repair: a facility where automobile maintenance activities are the primary use, including such specialized activities as auto painting, muffler repair and installation, tire sales and installation, and tune-ups.

Commercial-Industrial Shops: mixed-use developments typically including shop space and other heavy commercial/light industrial activities, offices and indoor storage; retail activities, if present, are clearly subordinate to the other uses in the development.

Convalescent Hospital: residential care facility providing skilled nursing to persons needing care and attention on a twenty-four hour basis.

Apartment Complex: a unified residential rental development consisting of at least three attached units but usually larger.

Condominium Complex: a unified residential development consisting of at least three attached units (but usually larger), where each unit is owned independently of the other units in the complex.

(c) Site Selection: In selecting the sites to survey within each land use category, we attempted to address several criteria, utilizing lessons learned from an earlier field survey. (1) We wanted to include at least nine or ten sites within each category; we only fell short of this goal in the "Savings and Loan" category, because "Banks" and "Savings & Loans" were considered to be in the same category at the outset of the field survey. (2) Within each category, we attempted to achieve a range in facility size and "company name" which was fairly representative of the kind of development that we have been getting, or expect to get, in suburban areas. (3) We attempted to include sites from various communities within each category. (4) We selected sites which either had an adequate parking supply on-site; or, if employees or patrons parked off-site, it was imperative that we be able to determine the level of off-site parking.



(d) Gathering Information: to aid us in designing the field survey and analyzing the data at its completion, we undertook an extensive search for appropriate information relative to each site. In most cases, we spoke with a manager of the facility (some by telephone, some in person) to determine when the typical peak use occurred. Managers also served as the principal source of information relating to number of employees (total and peak shift), where employees park, parking problems at the site, hours of operation, and in some cases, the gross floor area of the facility, as well as its vacancy factor. Numerous managers of facilities not included in the field survey were interviewed and provided us with worthwhile insights into general parking demand and problems. Other sources of data included building permit records, Assessor's records, and aerial photographs.

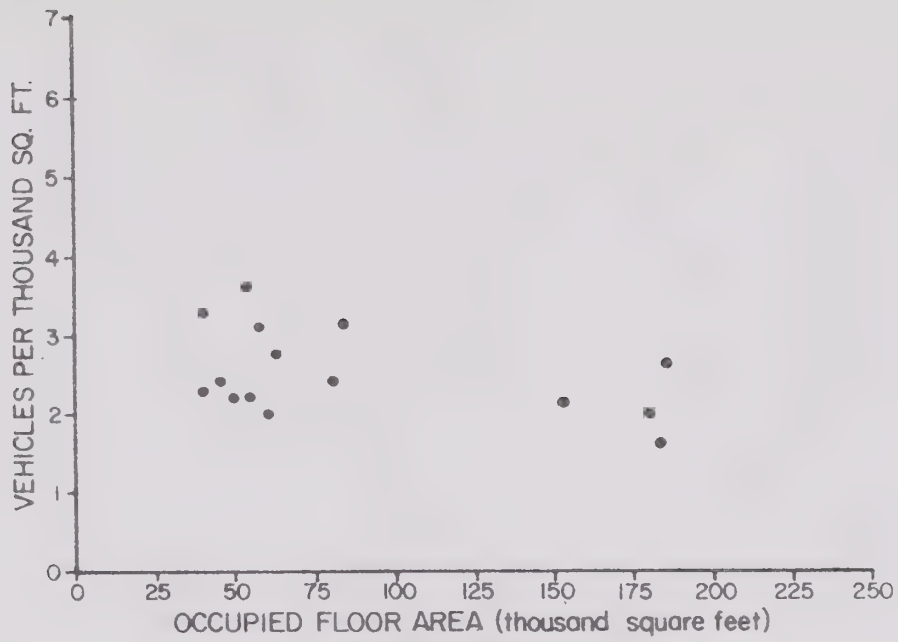
(e) Scheduling Field Work: Once we had selected an adequate number of sites in each category and knew their periods of peak use, we were able to map our field routes so as to maximize the number of meaningful counts conducted at each site. Our basic strategy was to survey each site at least twice (but usually more often) during each weekday, Monday through Friday. Facilities which also did substantial business on weekends were surveyed on at least two weekends; facilities which did evening business were also surveyed several times during evening hours. While we focused our counts on peak use periods, we did not hesitate to make several additional counts at other reasonable times when it was logistically possible to do so. Consequently, while at least ten counts were made at most sites, generally more than ten counts were made, with numerous sites counted in excess of forty times.

Realizing the need to complete the field counts in advance of the height of the Christmas shopping season, most field work was conducted between October 22 and November 19, 1979. The categories of "apartments" and "condominiums" were exceptions--field counts extended through the third week of December, since the Christmas season was deemed to have little or no effect on late-night parking demand at these facilities.

Survey Results: The graphs on the following pages illustrate the results of the field survey. The approach which we used in preparing the graphs was similar to that used by Boylan and Kenig in An Approach to Determining Parking Demand (Planning Advisory Service, Report No. 270, June 1971.)

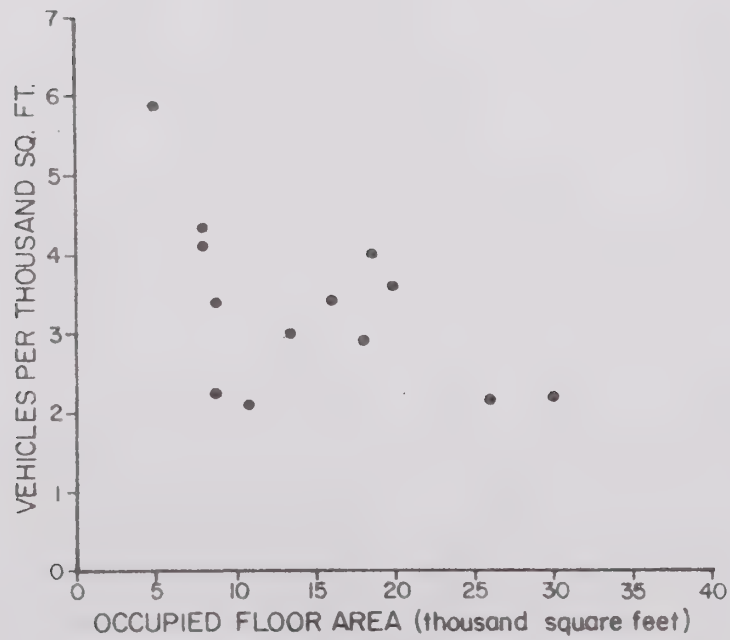
Our first step in preparing the graphs was to calculate the "peak parking demand" for each site within a given land use category; this "peak demand" was determined by averaging the three highest counts made at each site during the course of the field survey. The demand for each site was then converted to a ratio (vehicles per 1000 square feet of occupied gross floor area) to enable the direct comparison of each site, and then plotted on the appropriate graph.

Separate graphs (with differing scales) were prepared for each of the seventeen land use categories (Graphs 1 through 17). Our initial intent was to fit a curve to the points plotted on each graph, as was done in the Boylan and Kenig study. However, the variation in parking demand was great, irrespective of facility size, for several of our land use categories; consequently, fitting a curve to the points would not have illustrated anything very meaningful. The graphs can be useful in establishing parking standards, though, in that the points are representative of the variation in parking demand that we might expect for various types of uses. An examination of the extent and nature of the variation, then, should lead to reasonable parking standards.



Graph 1

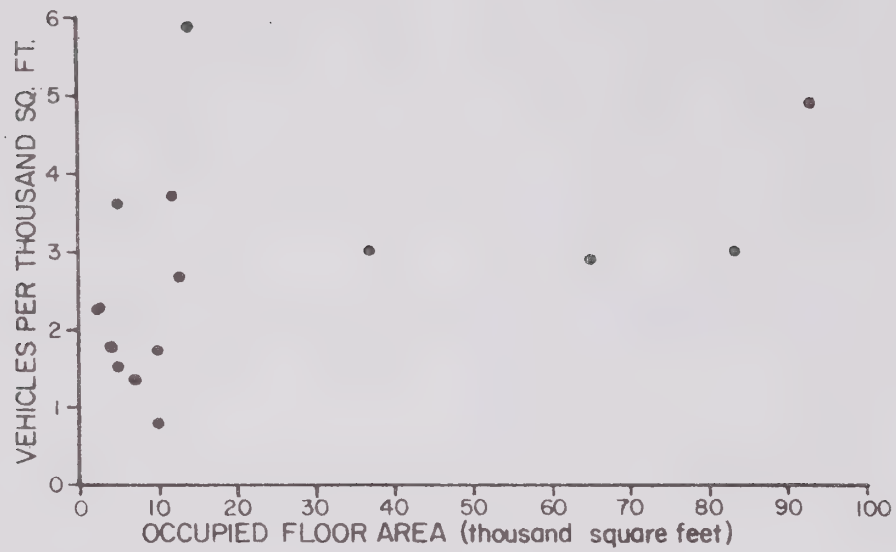
NEIGHBORHOOD & COMMUNITY SHOPPING CENTERS



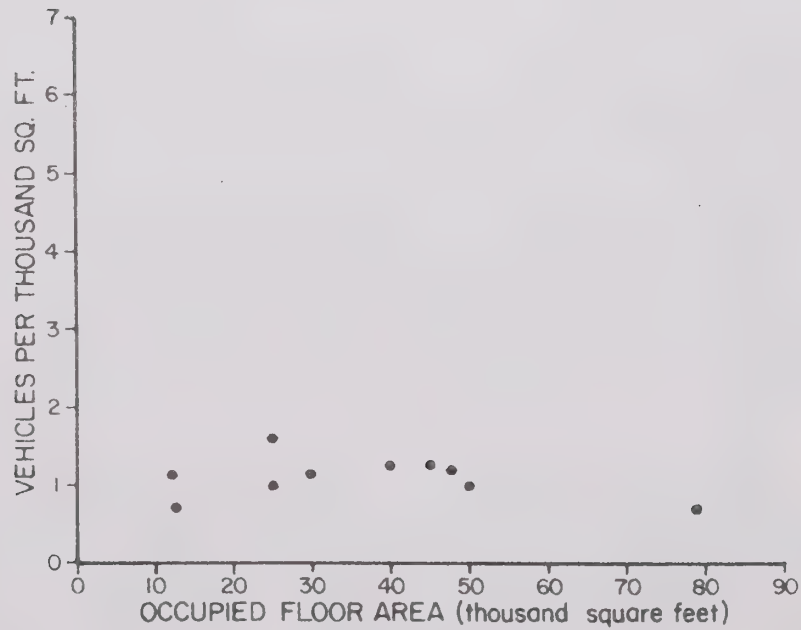
Graph 2

MIXED RETAIL FACILITIES

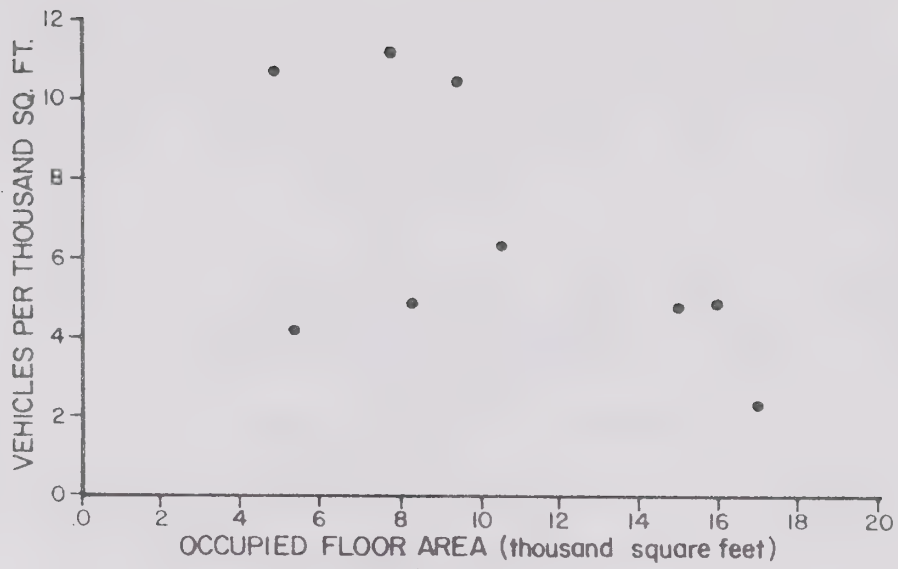




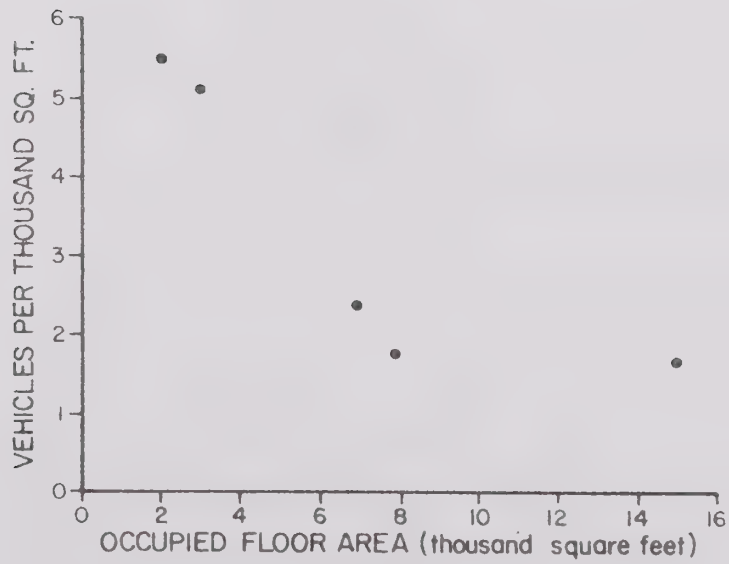
Graph 3  
SINGLE RETAIL FACILITIES



Graph 4  
CONVALESCENT HOSPITALS

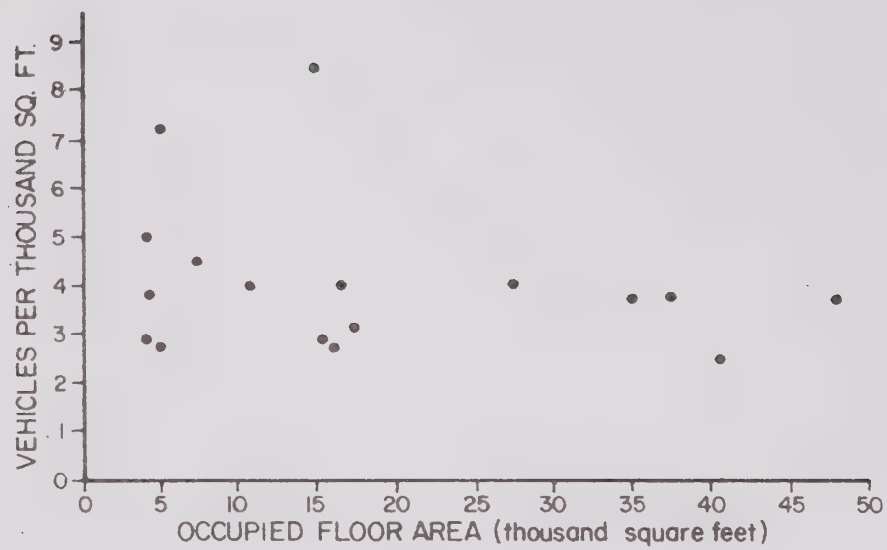


**Graph 5**  
**BANKS**

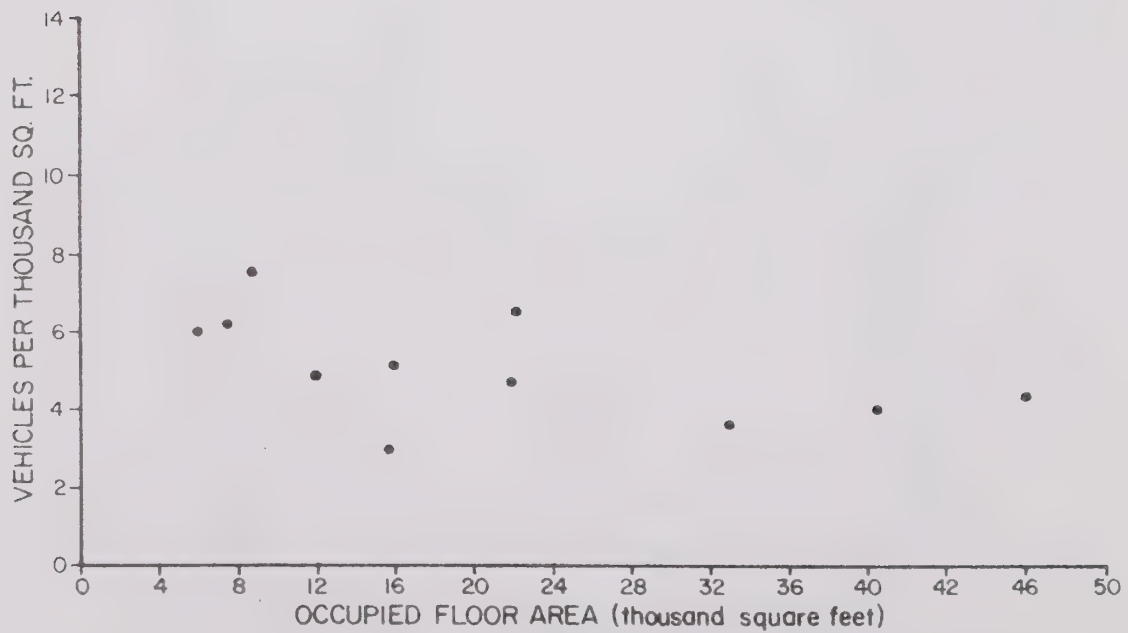


**Graph 6**  
**SAVINGS & LOANS**

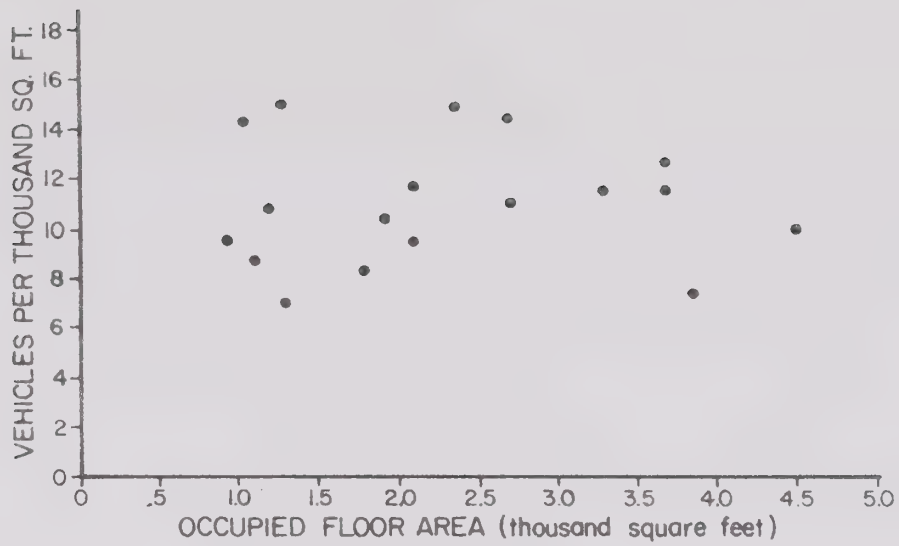




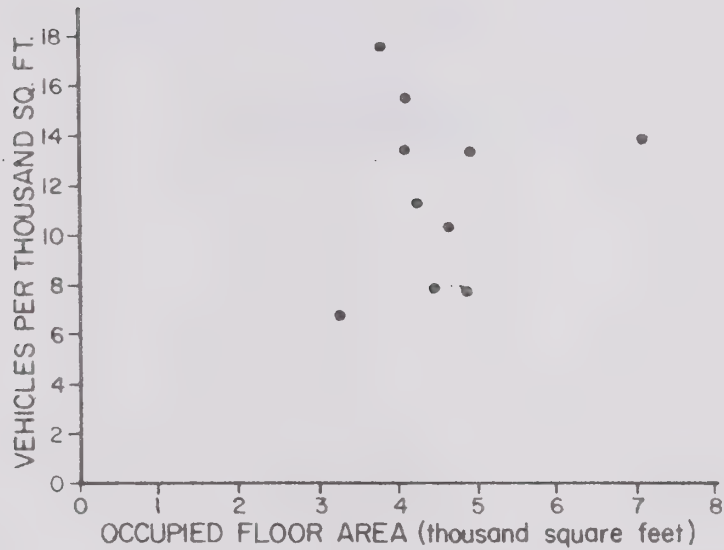
**Graph 7**  
**BUSINESS AND PROFESSIONAL OFFICES**



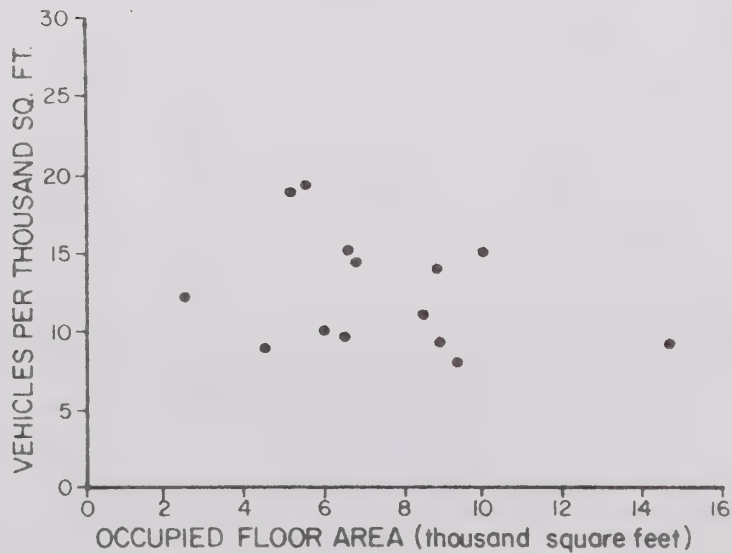
**Graph 8**  
**MEDICAL-DENTAL OFFICES**



Graph 9  
FAST FOOD RESTAURANTS

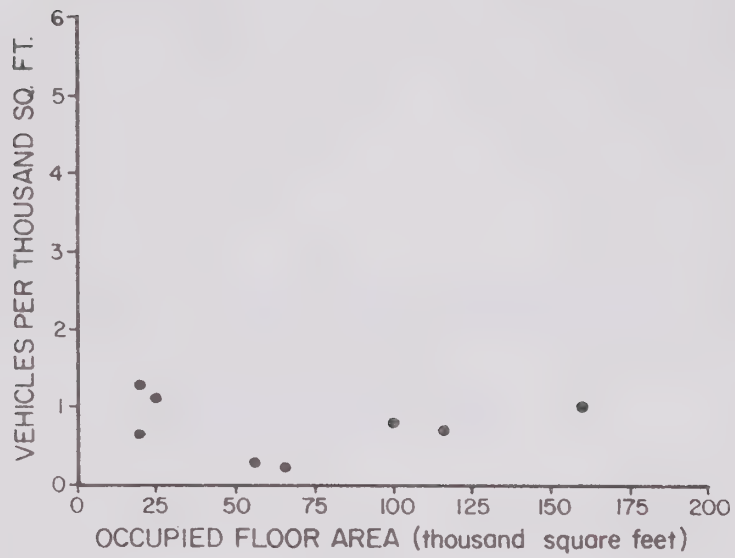


Graph 10  
HIGH-VOLUME SITDOWN RESTAURANTS

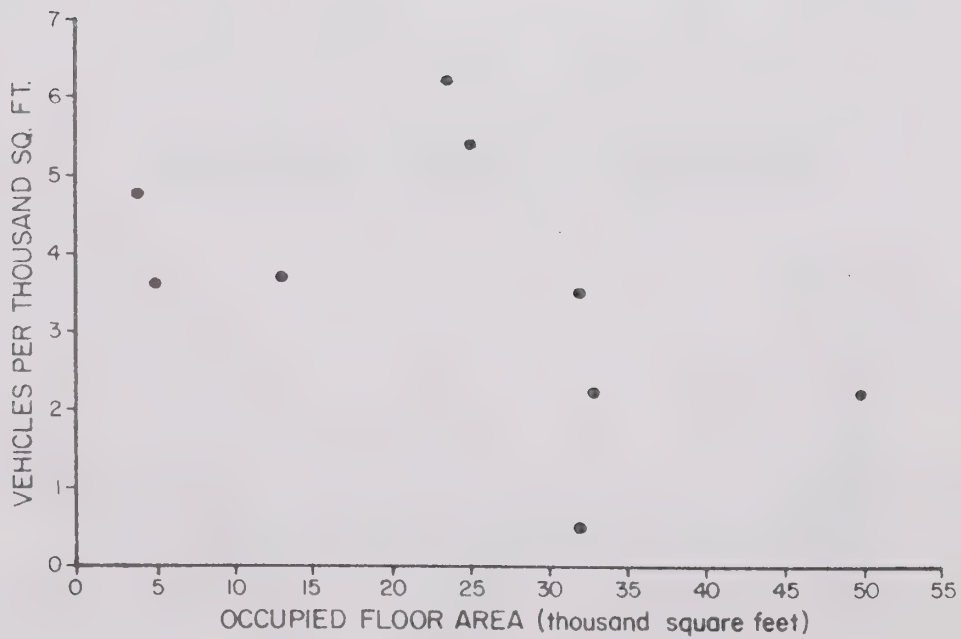


Graph 11  
DINNER RESTAURANTS

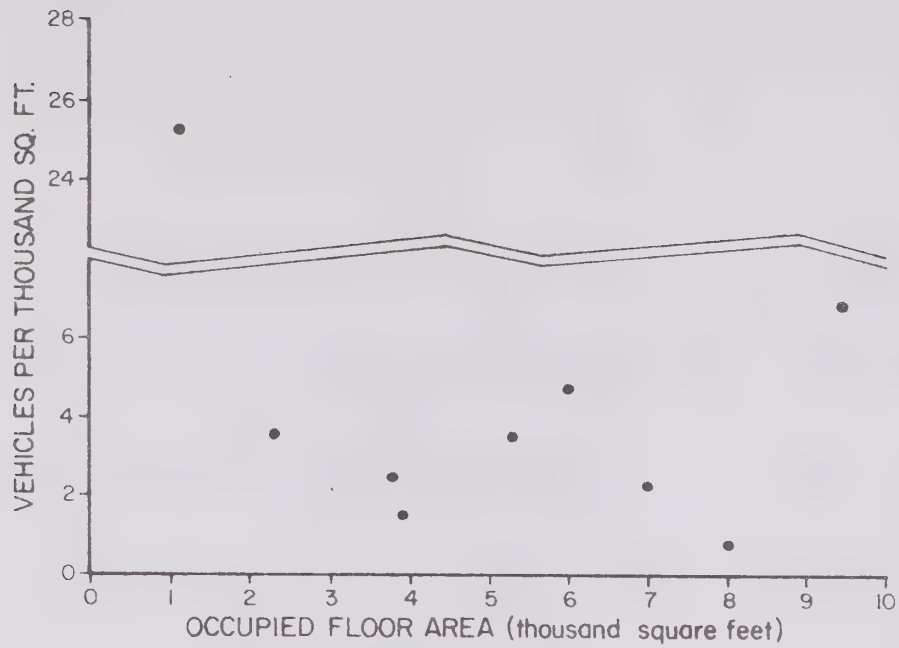




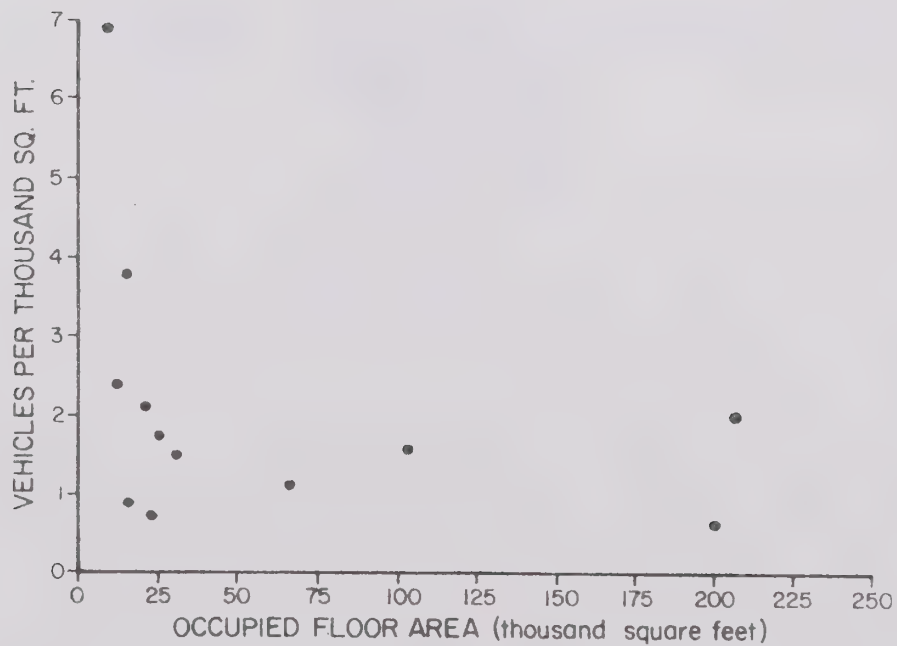
Graph 12  
FURNITURE STORES



Graph 13  
BUILDING SUPPLY FACILITIES

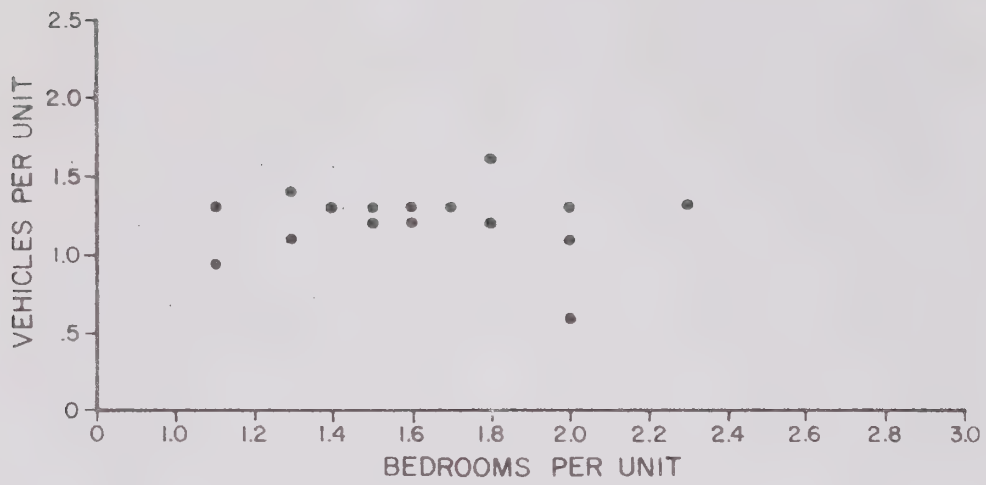


**Graph 14**  
**AUTO REPAIR FACILITIES**

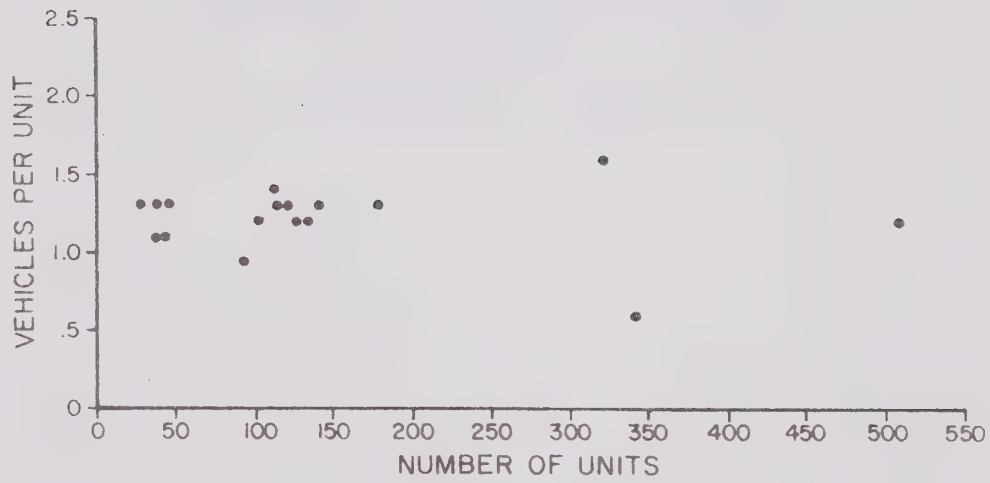


**Graph 15**  
**COMMERCIAL-INDUSTRIAL SHOPS**

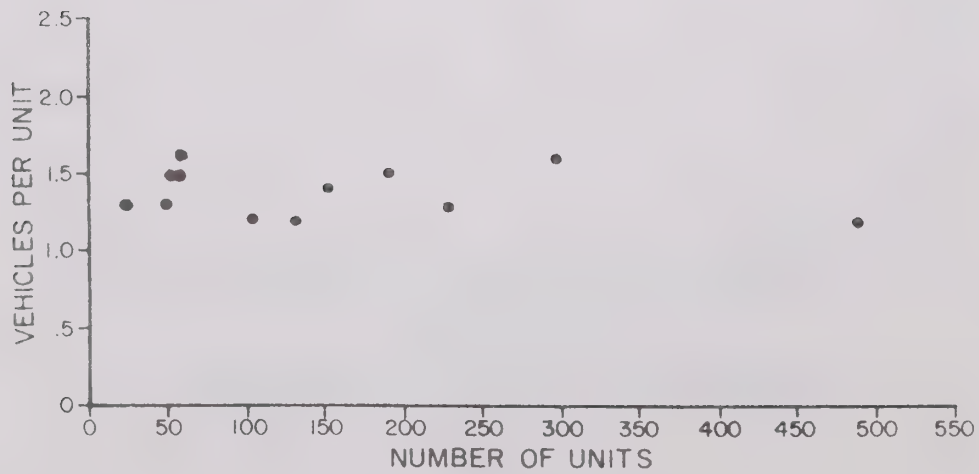




Graph 16A  
APARTMENTS



Graph 16B  
APARTMENTS



Graph 17  
CONDOMINIUMS

Table II-1 includes information which is useful in comparing the survey results with the existing City and County parking requirements. The first column of Table II-1, Average Peak Demand, is the average (mean) of the peak parking demands which were calculated for each of the sites within each land use category. The standard deviation was calculated for each category (second column) and added to the mean to obtain the "Potential Normal Peak Demand," which is indicated in the third column. The values in the third column, then, are indicative of the parking demand that could potentially occur at sites within the given land use categories. These "potential demand" values would be useful in establishing parking requirements where the selected approach is to set a standard which results in adequate parking for most (but not all) potential developments within specific land use categories. The fourth and fifth columns show the present parking requirements for the County and the City of Sacramento, respectively.

A reasonable approach to utilizing the "potential normal peak demand" values in establishing parking requirements would be simply to round those values upwards to the next "one-half" vehicle per 1000 square feet of gross floor area. For example, the potential normal peak demand at Neighborhood and Community Shopping Centers is 3.07 vehicles per 1000 square feet of floor area, based upon our sample survey; a reasonable parking standard might be 3.5 spaces per 1000 square feet. The potential normal peak demand at Medical-Dental buildings is 6.35 vehicles per 1000 square feet; a reasonable parking standard might be 6.5 spaces per 1000 square feet. Such an approach would appear to result in parking standards which are reasonable, easy to understand and apply, and cognizant of the fact that the sample survey could have understated actual parking demand (always a possibility where sampling is involved).

Peak parking demand for each site, as indicated above, was determined by averaging the three highest counts. This method was selected with the intent of identifying an "average" or "typical" peak for each site, a level of parking which might occur numerous times in a year, rather than the single highest parking level which could occur. It was also hoped that the effects of any errors that might have been made during the field counts, or any unusual or non-typical circumstances affecting the site, would be lessened by averaging the three highest counts.

We did, however, investigate the highest counts at sites in some of the categories to assure that major differences in parking demand would not be overlooked. Of course, most sites showed slightly higher demand; a few sites showed significantly higher demand where one count was much higher than any other count. The "average peak demand" of each land use category sampled was slightly higher (0.2 vehicle per 1000 square feet was typical, with some more and some less). Of greater importance, though, is the fact that the same general "scatteration" resulted when the sites were graphed as was the case when the three highest counts were averaged for each site. Also, because the variation between sites is so great, most sites still fall below the "potential normal peak demand" level as calculated on Table II-1.



TABLE II-1  
AVERAGE PEAK DEMAND AND EXISTING STANDARDS

Land Use Category	Average Peak Demand (vehicles/1000 sq.ft.)	Standard Deviation	Potential Normal Peak Demand (mean + standard deviation) (vehicles/1000 sq.ft.)	Existing* Sacto. Co. Requirement (spaces/1000 sq.ft.)	Existing* Sacto. City Requirement (spaces/1000 sq.ft.)
1. Neighborhood & Community Shopping Center	2.51	0.56	3.07	over 8.57	4.0
2. Mixed Retail	3.35	1.08	4.43	8.57	4.0
3. Single Retail	2.79	1.41	4.20	8.57	4.0
4. Convalescent Hospital	1.11 (or 1.43 vehicles/4 beds)	0.24 (or 0.36/4 beds)	1.35 (or 1.79 vehicles/4 beds)	1 space/4 beds	1 space/2 beds
5. Banks	6.64	3.30	9.94	5.0	4.0
6. Savings & Loans	3.28	1.59	4.87	5.0	4.0
7. Business & Professional Offices	3.78	1.20	4.98	5.0	2.5
8. Medical-Dental	5.03	1.32	6.35	5 +	
9. Fast Food Restaurants	11.12 (or 1.17 vehicles/3 seats)	2.47 (or 0.33/3 seats)	13.59 (or 1.50 vehicles/3 seats)	) ) ) 1 space per ) 3 seats	) ) ) 1 space per ) 3 seats
10. High Volume Sitdown Restaurants	11.87 (or 1.16 vehicles/3 seats)	3.59 (or 0.33/3 seats)	15.46 (or 1.49 vehicles/3 seats)	) ) ) 3 seats	) ) ) 3 seats
11. Dinner Restaurants	12.63 (or 1.18 vehicles/3 seats)	3.82 (or 0.42/3 seats)	16.45 (or 1.60 vehicles/3 seats)	) ) )	) ) )
12. Furniture Stores	0.71	0.38	1.09	2.0	4.0
13. Building Supply	3.57	1.77	5.34		
14. Auto Repair	3.19	1.81	5.00		
15. Commercial-Industrial Shops	1.67	0.84	2.51	3.33	2.0
16. Apartments	1.25 vehicles/unit	0.14	1.39 vehicles/unit	1.5 spaces/unit	1.0 spaces/unit
17. Condominiums	1.38 vehicles/unit	0.15	1.53 vehicles/unit	2.1 spaces/unit	1.0 spaces/unit

\* Where possible, existing standards are expressed in terms of "parking spaces required per 1000 square feet of gross floor area" so as to be more readily compared to the average peak demand determined by the field survey.

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Seasonal Peak: To gain insight into seasonal variation in parking demand in Sacramento County, aerial photographs were taken at ten shopping facilities on one of the busiest shopping days of the year, the second Saturday before Christmas during early-to mid-afternoon. The ten facilities photographed included two regional shopping centers, five community shopping centers, and three single retail facilities. While the regional shopping centers were virtually full, most other retail facilities (particularly community shopping centers) had a considerable number of unused parking spaces.

Conclusion: The parking demand study of suburban areas has shown that parking requirements contained in zoning ordinances in both the City and County of Sacramento do not reflect actual suburban demand in a number of land use categories.

The County requires excessive parking for most retail and shopping center categories, furniture stores, and perhaps commercial-industrial shops and condominiums; inadequate parking is required for convalescent hospitals, banks, medical-dental buildings, and restaurants.

The City requires excessive parking for furniture stores and perhaps convalescent hospitals; inadequate parking is required for banks, business and professional offices, restaurants, apartments, and condominiums.

Establishing Parking Requirements: Most urban jurisdictions establish off-street parking requirements to assure that each development is able to accommodate the vehicular traffic which it attracts. While several approaches are possible, most jurisdictions express their parking requirements in terms of "minimum standards"--for example, the Sacramento County Zoning Code requires that an office development provide at least one parking space for every 200 square feet of gross floor area. Other approaches are discussed in a later chapter evaluating alternative parking management strategies.

There have been numerous articles written on parking demand and establishing parking requirements. Given the fact that some of the factors affecting parking demand can vary greatly in different municipalities, particularly population and socioeconomic characteristics, most of those articles point out the need to base local requirements on a local study of parking demand.

The Sacramento County suburban parking demand survey further points out the potentially wide variation in demand at similar businesses at different locations within the same "municipality." Obviously, the establishment of specific parking requirements must rely on some kind of "averaging" of the observed demand at several businesses within a given land use category.

The immediate consequences of insufficient parking are potentially more severe than are those of excessive parking. While the provision of excessive parking is essentially an inefficient use of land and a community "eyesore," insufficient parking can lead to overflow-on-street parking, increased traffic congestion, and veritable safety hazards.

The establishment of minimum parking standards, then, should be done in a manner which results in most developments having a sufficient yet realistic amount of off-street parking. The risk of increased traffic congestion due to insufficient parking would remain minimal, yet acres of paved but unused parking areas would be avoided.



If Sacramento County continues to pursue a policy of "minimum" parking standards, it would be appropriate to alter many of the present standards to more closely reflect the peak parking demand which might be expected to occur regularly for given land uses. Utilizing the methodology described previously, recommended minimum standards for suburban Sacramento County are indicated in Table II-2.

TABLE II-2

RECOMMENDED MINIMUM PARKING STANDARDS, SUBURBAN SACRAMENTO COUNTY

<u>Land Use Category</u>	<u>Minimum Requirements (Spaces/1000 Sq. Ft. Gross Floor Area)</u>
1. Neighborhood and Community Center	3.5
2. Mixed Retail	4.5
3. Single Retail	4.5
4. Convalescent Hospital	1.5
5. Banks	10.0
6. Savings and Loans	5.0
7. Business and Professional Offices	5.0
8. Medical-Dental Offices	6.5
9. Fast Food Restaurants	14.0
10. High Volume Sitdown Restaurants	15.5
11. Dinner Restaurants	16.5
12. Furniture Stores	1.2
13. Building Supply	5.5
14. Auto Repair	5.0
15. Commercial-Industrial Shops	3.0
16. Apartments	1.5 spaces/unit
17. Condominiums	1.6 spaces /unit

## CHAPTER III

### PARKING MANAGEMENT STRATEGIES

The basic purpose of this chapter is to recommend parking management measures for implementation in the Sacramento area. While the emphasis in this report is on the suburban areas of Sacramento County, packages of parking management measures for the Central City (the result of screening by the City Planning staff) are included in this chapter so as to put the overall parking management program into proper perspective.

Pertinent background material is incorporated herein to assist the reader in understanding the process which was used to arrive at the recommended program. The chapter is divided into six basic sections: (a) a comprehensive listing of potential strategies and measures for parking management; (b) a discussion of the procedure used to screen and evaluate the measures; (c) a discussion of supply management measures pertaining to the suburbs; (d) a discussion of pricing measures pertaining to the suburbs; (e) recommended strategy/measure packages for suburban areas; and (f) recommended strategy/measure packages for the Central City. The discussions of supply management and pricing measures for the suburbs are included because of the potential significance and controversy surrounding many of those measures, controversy which results from their "disincentive" nature. Recommended measures relying on incentives to use other travel modes (such as the provision of bicycle, pedestrian, or transit amenities), as well as other parking lot design issues, are detailed in the following chapters.

#### A. POTENTIAL STRATEGIES AND MEASURES FOR PARKING MANAGEMENT

The following list is an unscreened compilation of numerous parking management measures which have been considered in past parking management studies. For purposes of examining these measures from the perspective of improved air quality, they have been grouped into four general strategies for reducing vehicle emissions. The four strategies are:

- . Strategy One:     Disincentives to auto travel through management of the supply of parking
- . Strategy Two:     Disincentives to auto travel through management of the price of parking
- . Strategy Three:   Reducing auto travel through incentives to alternative travel methods
- . Strategy Four:    Reducing auto emissions through better parking facility design

Strategy One, Two and Three are concerned with directly affecting travel behavior, while Strategy Four looks at the elements of design which are independent of travel mode choice. The behavioral strategies are primarily concerned with the single-occupant auto as the main contributor to vehicle emissions. Strategies One and Two seek to manage parking so as to discourage auto travel, especially single-occupant auto travel, while Strategy Three seeks to encourage and reinforce the decision to use an alternative travel method with more benign air quality impacts than the single-occupant auto.

This list of measures, in effect, serves as a starting point from which a workable, coordinated parking management program can be developed. While this list is lengthy, we realize that many variations of a given measure may exist; we therefore considered such variations during the course of evaluating these measures.

The categorization of the measures into four general "strategies," too, is worthy of a parenthetical comment. This grouping was done to aid in the evaluation process. The reader will note that some overlap may occur among the four strategies, and certain measures may fit as well into one strategy as another. Additional strategies could have been defined, but to do so would not have altered the ultimate result--specific parking management measures recommended for implementation. Again, the grouping into general strategies was done only to aid in evaluating the specific measures.

Parking management for the Sacramento region is a complex subject because of the great differences between travel and parking conditions found in the downtown Central City and those conditions which exist in the suburban areas. Basic differences between the two extend to methods of travel, frequency of travel, cost and availability of parking, trip purposes and economic conditions. Measures appropriate to one part of the region may not be appropriate to another, so each measure must be analyzed for its applicability to the Central City and to the suburbs. Once the measures have been screened and evaluated, balanced "packages" of measures can be created which will result in a comprehensive parking management program for the Sacramento region, a program which will reduce vehicle emissions and improve air quality.

#### Strategy One: Disincentives to Auto Travel Through Management of the Supply of Parking

Under this strategy, reductions in vehicle emissions would be accomplished by limiting the supply, availability and convenience of parking. This would in turn induce auto drivers to reduce the number of trips they make or the number of miles they travel, thereby reducing overall emissions. Three general categories of parking are included in this approach: on-street parking spaces; publicly-controlled off-street spaces; and privately-controlled off-street spaces. Within these general categories, the strategy includes measures to manage the existing supply of parking and measures to guide the development and management of the future supply of parking.

##### I. MANAGEMENT OF ON-STREET SPACES

###### A. Management of the existing supply of on-street spaces

###### Measure 1: Change the character of the on-street parking supply

1. Shift spaces from unlimited "all day" use to time-limited use
  - a. Install more parking meters on unlimited spaces
  - b. More spaces with designated time limits
  - c. More spaces with parking prohibited during the morning and evening commute periods



2. Tighten restrictions on time-limited parking
  - a. Replace unmetered time-limited space with metered spaces
  - b. Shorten the parking duration for time-limited spaces
3. Initiate residential parking permit programs in selected areas to ease parking congestion and restrict the availability of parking to non-residents

Measure 2: Reduce the amount of on-street parking

1. Increase the number of blocks with on-street parking prohibited
2. Reduce the average number of on-street spaces per block
  - a. Increase the size of marked spaces
  - b. Increase the number of "no parking" and "loading zone" areas
  - c. Mark parking spaces on blocks where unlimited spaces are not presently marked to limit the number of vehicles which can legally park on the block
3. Create "auto-free zones" where auto access and parking are limited or prohibited
  - a. Individual streets with traffic diverters
  - b. Pedestrian and/or transit malls with cross traffic allowed
  - c. Groups of blocks aggregated into auto-free zones with no or little through auto traffic allowed

B. Management of the future supply of on-street spaces

Measure 3: Reduce or eliminate on-street parking which would otherwise be provided on new or realigned streets such as:

1. Along major arterials and thoroughfares
2. Adjacent to new or enlarged concentrations of employees or students
3. Adjacent to new or enlarged commercial developments

## II. MANAGEMENT OF PUBLICLY-CONTROLLED OFF-STREET SPACES

### A. Management of the existing supply of public off-street spaces

#### Measure 4: Restrict the availability to the general public of long-term parking in public lots

1. Limit the number of available long-term spaces
  - a. Close off some spaces until after morning commute period
  - b. Establish short-term parking areas with time limits
2. Revise policies regarding monthly leases of parking spaces by the general public
  - a. Reduce or eliminate monthly leases at selected public lots to remove the convenience of a guaranteed assigned space
  - b. Relocate monthly leased parking to outlying public lots with lower demand, reserving more convenient lots for daily parkers

#### Measure 5: Restrict the availability of public parking to employees commuting by single-occupant auto

1. Offer monthly leases for assigned parking in public and government employee lots only to employees who commute by carpool with parking available to non-carpooling employees only on an unassigned, daily, first-come first-serve basis
2. Offer monthly leases for assigned parking in the most conveniently located employee lots only to carpooling employees, with parking by non-carpooling employees prohibited

### B. Management of the future supply of public off-street spaces

#### Measure 6: Restrain the growth of public parking spaces available to long-term parkers

1. Limit parking availability at new facilities during morning commute hours
2. Prohibit monthly leases at new facilities
3. Establish short-term parking areas in new facilities to limit supply of long-term spaces
4. Construct new parking facilities serving the general public in outlying areas, with some of the spaces in existing lots converted from long-term public parking to short-term parking or monthly carpool parking

Measure 7: Restrain the growth of public parking spaces available to employees commuting by single-occupant auto

1. Set aside all or a significant portion of new general public lots for lease by bona fide carpools on a monthly basis
2. Set aside all or most of the spaces in new employee lots for the exclusive use of employee carpools
3. Construct new employee parking facilities in the less convenient outlying areas; relocate single-occupant auto commuters to the outlying areas and reserve more convenient existing lots for employee carpools

### III. MANAGEMENT OF PRIVATELY-CONTROLLED OFF-STREET SPACES

#### A. Management of existing private spaces

Measure 8: Initiate a program to license private parking operators as a basis for regulating operations

1. Licenses for operators of pay parking facilities
2. Licenses for operators of free parking facilities

Measure 9: Require existing private off-street facilities to meet the same parking management requirements demanded of new development before issuing new City or County entitlements

#### B. Management of future private spaces

Measure 10: Adopt revised minimum and/or maximum parking space standards for new development

1. Reduce minimum amount of parking required for certain land uses shown to have significant underutilization of required parking
2. Reduce minimum amount of parking required for certain land uses to a point below anticipated demand
3. Establish a maximum amount of parking allowed for particular land uses or areas which could sustain a shift to alternative travel modes
4. Limit increases in the number of new spaces provided in areas of high auto traffic generation such as regional shopping centers, educational centers, concentrations of employment and the central business district



Measure 11: Provide for exceptions to revised standards which encourage vehicle emission reductions

1. Offer developers an opportunity to provide parking below the minimum standard and realize cost savings through an "in-lieu" program of incentives to alternative travel methods
2. Provide a method for developers to request parking below the minimum standard if they can show that the required parking is more than the amount necessary to serve the development
3. Reduce parking requirements for developments which enter into a long-term agreement for joint-use of nearby parking facilities which would be available during peak demand periods
4. Allow provision of parking above the maximum only if the developer mitigates the extra travel generation and vehicle emissions through an "offset" program to reduce vehicle travel
  - a. In the developer's own operations such as employee travel
  - b. In nearby operations
  - c. Through a regional alternative travel fund transfer program

Measure 12: Adopt new procedures for reviewing development proposals

1. Replace fixed quantitative standards with a flexible site review process to determine parking requirements for specific developments
  - a. Set a range, with required parking set within the range for that land use
  - b. Base requirements on projected demand for parking and access to alternatives
  - c. Base requirements on adopted policies to minimize trips or miles of travel
2. Require review of parking lot design for analysis of efficiency and emission characteristics

Strategy Two: Disincentives to Auto Travel Through Management of the Price of Parking

This strategy relies on the pricing mechanism to deter auto travel and thereby reduce vehicle emissions. The price of parking has been shown to be a central factor in decisions concerning choice of travel mode and frequency of auto trips. The measures under this strategy have been grouped into three categories: pricing of public on-street parking; pricing of publicly-controlled off-street parking; and pricing of privately-controlled off-street parking.

## I. PRICING OF PUBLIC ON-STREET PARKING

### Measure 13: Revise charges for on-street spaces

1. Raise the hourly charge for parking meters
  - a. For all meters
  - b. For meters in high demand areas
  - c. For areas where faster turnover is desired
2. Increase the number of metered spaces
3. Keep on-street hourly charges at or above the level for off-street spaces in the area

### Measure 14: Increase fines, penalties, and enforcement of parking violations

1. Increase on-street parking enforcement to catch more violators.
2. Increase fines for parking violations
3. Institute tow-away and impoundment for selected violations such as:
  - a. Repeated illegal parking in residential permit area
  - b. Illegally parked autos with prior unpaid parking fines.
  - c. Parking beyond time limit after first ticket notice

## II. PRICING OF PUBLIC OFF-STREET PARKING

### Measure 15: Develop rate structures to discourage long-term commuter parking

1. Replace daily maximum charge with an hourly flat fee
2. Institute pricing surcharge to discourage commuter parking before 9:00 or 10:00 a.m.
3. Eliminate or substantially reduce discount enjoyed by parkers with a monthly lease
4. Institute a sliding scale for public parking, with the hourly rate increasing after one or two hours
5. Develop "pricing zones" where parking would cost more in high-demand areas than in areas with a lower demand for parking
6. Standardize the rates for all publicly-provided parking among all jurisdictions

Measure 16: Revise the method of recovering construction and operating costs for publicly-owned parking facilities

1. Convert the pricing of public parking spaces to the "marginal cost" equivalent for providing a new public parking space (roughly \$60/month for the Central City in 1979).
2. Eliminate government subsidy of single-occupant employee auto parking where the price is not high enough to recover all costs for providing parking.
3. Set the price of "high demand" commuter parking above the "equilibrium" price with the extra funds used to cross-subsidize alternative travel modes
4. Eliminate or reduce parking validation in public lots

### III. PRICING OF PRIVATE OFF-STREET PARKING

Measure 17: Directly charge the general public for parking

1. Require or encourage installation of parking meters in private lots above a certain size or in certain areas
2. Install automated fee parking system in large retail lots

Measure 18: Directly charge employees for parking

1. Encourage employers to institute assigned parking and monthly rates for employees parking in their lots
2. Require employers or employment centers of a certain size to set aside employee parking and issue monthly permits at a specified rate, with exemptions for employees who:
  - a. Purchase a monthly bus pass
  - b. Walk or bicycle to work
  - c. Maintain a bona fide carpool

Measure 19: Levy taxes or assessments on parking

1. Parking tax surcharge added on directly to the price of all pay parking spaces, with the funds used to enforce parking regulations or cross-subsidize alternative travel methods
2. Parking space tax assessment on all operators of free and paid private parking available to the general public, with additional costs passed on to the parking public and additional revenue used to fund alternative travel methods



Measure 20: License and regulate private pay parking

1. Directly regulate rates
2. Place a floor under private rates

Strategy Three: Provide Incentives to Increase Alternative Travel and Reduce Auto Travel or Emissions

This strategy relies on inducing individuals to travel by an alternative to the single-occupant auto through direct incentives to alternatives rather than through disincentives to auto use. The incentives are grouped into four categories: incentives for ridesharing; incentives for transit patrons; incentives for pedestrian and bicycle travel; and incentives to travel by efficient and low-emission autos

I. RIDESHARING INCENTIVES

Measure 21: Provide ridesharing incentives to employees

1. Institute preferential parking for employee carpools
  - a. Lower rates
  - b. Guaranteed availability
  - c. Most convenient location
2. Employer-supported vanpools or subscription bus service
  - a. Provided free to employees
  - b. Employee contribution to defray costs
3. Flexible work schedules for ridesharing employees
  - a. Ability to set morning and evening arrival and departure times to fit ridesharing schedule
  - b. Four-day work week option for ridesharing employees as an incentive for participation
4. Ridesharing information packet made available to employees, provided by public agency
  - a. Computer matching service
  - b. How to start and maintain a pool
  - c. Benefits of ridesharing
  - d. How to set up a vanpool or subscription bus operation

Measure 22: Provide ridesharing incentives to the general public

1. Make monthly leases for carpool spaces available at public lots better than non-carpool leases
  - a. Better price
  - b. Better availability
  - c. Better location
2. Institute an on-street carpool program (similar to Portland, Oregon)
  - a. Issue monthly permits for bona fide carpool vehicles
  - b. Establish on-street "carpool parking" areas:
    - i. Spaces with "carpool parking only"
    - ii. Joint use areas, with "carpool parking allowed" in time-limited spaces for carpool vehicles with a valid permit
3. Develop park and pool lots

II. TRANSIT INCENTIVES

Measure 23: Establish a fund-transfer program from the following potential sources to increase transit service:

1. "In-lieu" contributions from developers putting in less than the required amount of parking
2. "Offset" contributions from developers generating excess auto traffic by putting in more than the maximum or required amount of parking
3. Revenue from a surtax on pay parking transactions
4. Revenue from a parking space assessment tax
5. Revenue from an assessment on employers for all employees commuting by single-occupant auto
6. Revenue from transit "validation".

Measure 24: Provide transit incentives to employees

1. Subsidized monthly transit pass
2. Flexible work schedules for transit patrons
  - a. Ability to set arrival and departure times to fit bus schedule
  - b. Four-day work week option as an incentive for transit use
3. Information packet on transit made available to employees

Measure 25: Provide transit incentives to the general public

1. "Validation" by stores of customer transit pass, with a discount on future transit passes based on the number of validations up to a certain limit
2. Require that transit amenities be provided in new and renovated commercial development of a certain type, size or area
  - a. Bus turnout or loading area in convenient location
  - b. Bus shelters
  - c. Kiosk with route and schedule information
3. Designate certain corridors as auto-free transitways to improve and speed up transit service
4. Develop park-and-ride lots to intercept auto traffic and provide express transit service to major destinations

III. PEDESTRIAN AND BICYCLE INCENTIVES

1. Provide bicycle amenities
  - a. Sheltered parking area in convenient location
  - b. Secure racks or lockers for bicycles
  - c. Showers for cyclists
2. Allow cyclists and pedestrians flexible work schedules
  - a. Ability to set arrival and departure times
  - b. Option to work a four-day week as an incentive to use alternative travel mode
3. Allow bicycling employees to claim a small mileage allowance to add to their salary as an incentive

Measure 27: Provide bicycle and pedestrian incentives to the general public

1. Require new and renovated commercial developments to install bicycle amenities
  - a. Sheltered bicycle parking area in convenient location
  - b. Secure racks or lockers for bicycles
2. Install bicycle lockers and racks at government facilities
  - a. Government offices with public traffic
  - b. Public parking lots and garages



3. Orient new commercial development for easy and safe access by pedestrians and bicyclists
  - a. Street-front orientation with parking in rear
  - b. Bicycle and pedestrian paths through or around parking areas to minimize conflict with autos
4. Bicycle and pedestrian travel corridors
  - a. Improve arterial bicycle corridors
    - i. Remove on-street parking
    - ii. Mark bicycle lanes and routes
    - iii. Separate bicycle lanes from on-street traffic by installing concrete parking stall wheel stops along edge of bicycle lane in heavy traffic areas.
  - b. Develop local auto-free bicycle and pedestrian corridors.

#### IV. EFFICIENT, LOW-EMISSION AUTOMOBILE INCENTIVES

Measure 28: Increase the availability of parking spaces for small autos

1. Restripe existing public lots to provide more small-car spaces and limit the supply available to larger cars.
2. Require the provision of a specific amount of small-car spaces in new and renovated commercial developments.
3. Provide marked "compact car only" on-street spaces.

Measure 29: Offer small autos a price discount for parking in public lots

#### Strategy Four: Reduction in Emissions Through Changes in Parking Lot Design

This strategy looks at emissions which are associated with parking lot design characteristics rather than focusing directly on travel choice decisions.

Measure 30: Improve vehicle operating efficiency in parking facilities

1. Set standards for access and interior flow within new off-street facilities to minimize idling and circling of autos.
2. Establish a procedure to review parking lot design for new and renovated commercial developments.

Measure 31: Increase parking lot landscaping requirements.

1. Require plants with a maximum beneficial air quality impact.
2. Apply the revised landscaping requirements to all existing developments which request a City or County entitlement to reduce the supply of available parking.

## B. SCREENING AND EVALUATION PROCEDURE

Developing a set of parking management measures for implementation in the Sacramento region necessitates a specific procedure to select from among the numerous possibilities those measures which are most appropriate to the conditions and needs of Sacramento. The following procedure was used to screen and evaluate the potential strategies and measures listed in the previous section:

1. Initial screening of measures;
2. General evaluation of measures for the Central City and suburbs;
3. Secondary screening of measures;
4. Development of specific packages combining screened strategies and measures.

### Step 1: Initial Screening of Measures

Each potential measure was assessed to determine whether it was applicable to the Central City, the suburbs, or the region as a whole. Each measure was then examined for compatibility with the basic criteria which have been established for the initial screening.

### Initial Screening Criteria

1. The measure should significantly reduce vehicle emissions by either:
  - a. Reducing vehicle miles of travel (VMT), or
  - b. Reducing the number of vehicle trips, or
  - c. Reducing emissions within parking facilities.
2. The measure should be primarily effective within a short (1-2 years) or medium (3-7 years) timeframe in order to meet 1987 air quality objectives. Longer-term measures with little immediate effectiveness will be considered if they will be effective.
3. The measures may be either an incentive to more efficient travel methods or a disincentive to inefficient travel methods, but measures should not rely on:
  - a. Direct disincentives to non-work trips which would have important adverse economic consequences; nor
  - b. direct disincentives at the residential generation end of the trip.
4. The measure must not involve major implementation obstacles.

Measures which did not meet all four criteria were eliminated from further consideration and analysis.

## Step 2: General Evaluation of Parking Management Measures

This step continued the screening process by looking at, in general terms, the implementation, secondary impacts, effectiveness and the interaction among each of the potential parking management measures. The purpose of the general evaluation was to focus on those strategies and measures which showed the greatest potential to effectively reduce emissions, which have beneficial or neutral secondary impacts, and which can feasibly be implemented. The following evaluation criteria were used at this and later stages of evaluation.

### Evaluation Criteria

1. Effectiveness: Ability of the measure to achieve the primary objective of reducing vehicle emissions. Specific performance measures of effectiveness include:
  - a. Reduction in VMT;
  - b. Reduction in vehicle trips;
  - c. Shifts in travel modes;
  - d. Reduction in emissions through parking facility design.
2. Impacts: The measure's potential to positively or negatively affect objectives or concerns other than air quality.

Secondary impacts include:

- a. Energy conservation;
  - b. Land use efficiency and compatibility;
  - c. Equity;
  - d. Noise, water quality, and other environmental impacts;
  - e. Traffic circulation and safety;
  - f. Economic development and viability;
  - g. Individual mobility;
  - h. Aesthetics.
3. Implementation: Procedures, institutions, resources and legal requirements involved in implementing the measure. Implementation considerations include:
    - a. The process to be followed in implementing the measure;
    - b. The timeframe for implementation;



- c. Resource costs to develop, implement, administer, monitor and enforce the measure;
- d. Institutions involved in specific aspects of implementation; and
- e. Legal requirements, constraints and prohibitions affecting implementation.

### Step 3: Secondary Screening of Measures

Those measures which were identified in Step 2 as having important problems of effectiveness, secondary impacts or implementation difficulties were revised or eliminated. A final set of strategies and measures appropriate to the Central City, the suburbs, and the region as a whole was selected.

### Step 4: Development of Specific Packages Combining Screened Strategies and Measures.

The organization scheme described below was used for packaging the screened and evaluated parking management measures prior to final consideration by decision makers. The essential organizing element is feasibility - the ability of the City, County and State to actually implement the package. Feasibility is the essential consideration because any comprehensive parking management strategy which is adopted, to be successful, must take into account the costs of implementation, the conditions required for the components of the strategy to work, and the legal, institutional and fiscal barriers which must be overcome.

Organizing the selected strategies into packages based on feasibility directly links the measures to be taken with the level of effort required for success. Decision makers and the public can therefore clearly understand the relationship of the benefits to be provided with the costs of implementing the package. It also allows the decision makers to determine the level of effort which the City, County and State can afford to sustain - an important consideration in today's fiscal climate.

In addition, packaging the strategies by level of feasibility affords decision makers the opportunity to adopt a phased program, with the most feasible measures implemented first, and monitored to determine their effectiveness. More complex or difficult measures can then be phased in, either as conditions change (such as increased funding availability or increased transit service), or to reinforce the effect of the initial measures.

The following categories are proposed for grouping the measures which survive the screening and evaluation process. The measures are grouped by increasing levels of difficulty.

Package I: Measures which can be implemented unilaterally by the City, County or State and which involve only minor resource allocation costs.

Package II: Measures which require close coordination between the City, County or State and cannot be implemented unilaterally but which involve only minor resource allocation costs.

Package III: Measures which can be implemented unilaterally by the City, County or State but which involve more significant allocation of resources for development, operations, monitoring or enforcement.

Package IV: Measures which require close coordination between the City, County, or State and which also involve more significant allocation of resources.

Package V: Measures which require the active participation of the private sector to be effective.

Package VI: Measures which are contingent on actions or services of institutions other than the City, County, or State, or which require changes in existing laws or funding mechanisms.

Packages I and II represent the "quick and easy" options open to the City, County, and State, and could constitute the first phase of a comprehensive parking management program for the region. Packages III and IV involve a greater commitment of time, money and staff, and the measures in these packages could be implemented incrementally in a phased fashion as resources become available. Package V could be implemented concurrently with the other packages. It is considered as a separate package because the feasibility of the measures is dependent on the response of the private sector as well as on the decisions made in the public sector. The measures included in Package VI are characterized by greater complexity and uncertainty than any of the other packages. Implementation of these measures would require significant changes in existing conditions or legal constraints and therefore could only be implemented in concert with other institutions such as regional transit, the legislature and the federal government.

## C. DISCUSSION OF SUBURBAN SUPPLY MANAGEMENT MEASURES

The premise of supply management measures is that the fact of less available parking spaces will make it more difficult for people to find a place to park, and this in turn will induce them to use some other means of travelling than by single occupant auto. The difficulty is devising an effective and equitable way of reducing parking space availability in a milieu of abundant, free suburban parking.

We have identified 12 measures which more or less fit under this strategy. They may be categorized as on-street or as off-street measures. Clearly, suburban supply restriction measures must focus on measures impacting primarily off-street parking supplies. On-street restrictions are useful--even necessary--primarily as a follow-up measure to a specific off-street parking program. Table III-1 provides further characterization. Those measures applicable to suburban areas are identified by an "S" in the table. Note that there is but one suburban-oriented measure relating to public lots, specifically at Metro Airport and local colleges.

For any of these measures to work as a means of reducing VMT, three important things must happen:

1. Drivers must experience regular difficulties in finding a convenient place to park to the point of developing an expectation that it will be difficult,
2. Drivers must be unwilling or unable to park further away from their destination, and
3. Other forms of transportation must be available.

Additionally, according to the screening criteria, the program must focus primarily on the home-work trip without adversely affecting the home-shopping trip, and should be effective in the short and medium term. Any supply restriction strategy should therefore include:

- o Limitation of supply below average peak demand.
- o A program to limit on-street parking to long-term parkers. This essentially means a residential parking permit program.
- o Prohibitions, or barriers which prevent employees from parking in customer or visitor areas.
- o Assurances that businesses will not be forced to relocate to avoid parking problems.

### Licensing of Businesses

This strategy is the only one we could devise which feasibly could effect existing parking supply and achieve the greatest level of change in VMT. It also has the most substantial problems. According to this strategy, all businesses or groups of businesses with shared parking exceeding, say, 100 spaces would be required to submit a parking control plan which restricted the supply of spaces available to employees and included incentives to use alternative transit modes. Failure by a business to submit an acceptable plan could lead to withholding the business license.



TABLE III-1  
CLASSIFICATION OF SUPPLY MANAGEMENT MEASURES

OFF-STREET PARKING				
PRIVATE			PUBLIC	
E				
X	S	1) Licensing	S,C	1) Limit Long-Term Parking C
I	P			
S	A			2) Restrict Availability C
T	C			to Single-Occupant
I	E			Commuters
N	S			
G				
		2) Revised Minimum -	S,C	3) Limit Long-Term Parking S <sup>1</sup> ,C
		Maximum Standards		at New Facilities
		3) Limit Increases in	S,C	4) Restrict Single C
		High Traffic Genera-		Occupant Auto Availa-
F	S	tion Areas		bility at New Facilities
U	P			
T	A	4) Provide for Certain		
U	C	Standard Exemptions	S	
R	E			
E	S	5) Provide Requirements	S,C	
		in Lieu of Trade-Offs		
		6) Provide Use Permit	S,C	
		Requirement		
		7) Establish Site Plan	S,C	
		Review Process		
R		8) Requirements Regarding	S,C	
E	S	New Spaces Made		X
M	P	Applicable		
O	A			
D	C			
E	E			
L	S			
E				
D				

(Continued)

TABLE III-1 (Cont.)

ON-STREET PARKING		
PRIVATE		PUBLIC
EXISTS ING		2) Change the Nature of Restrictions S,C  3) Reduce the Supply C
FUTURE REPLY		4) Policy of Restricting Parking on New/Realigned Streets S,C

<sup>1</sup>Applicable to Metro Airport only.

Note: Measures applicable to suburban areas and Central City are marked by a "S" and "C" respectively.

Substantial legal, political, financial, and practical implementation problems make this strategy unworkable. They include the questionable legality of discretionary approval attached to a traditionally ministerial action, the legality of provisions which would abrogate long-term private lease provisions, the likelihood that substantial inequities would result in applying the program, the cost to the private sector, substantial administrative cost, uneven implementation by administrators, practical problems in getting multiple tenants to cooperate and agree on a parking control strategy, substantial public opposition to a massive bureaucratic undertaking, the probability that many parking plans would be weak and ineffective in encouraging mode shifts, and a lack of incentive by employers to enforce the plans. Other problems are easily identified on closer inspection. This strategy was eliminated from further consideration on the basis of these insurmountable impediments to implementation.

#### Revised Maximum and Minimum Standards

Few options under this measure are identified in the initial strategy list. The first would lower standards to better meet demand. Since these standards would be set so that parking supply would remain adequate on all but peak use days, there would be little if any inducement to change mode, and no VMT reduction attributable to this mode. We have therefore not included this option as a VMT reduction measure, although recommendations for standard revision are forwarded as part of another phase of this report.

The second option would reduce parking requirements to a point below anticipated demand. To act as a supply restriction, yet protect against developers who might grossly underprovide parking, both maximum and minimum standards would be established for each land use category likely to involve significant employee concentrations. The actual values would be tailored to the demand characteristics of each use category, but in each case the maximum would be slightly less than the average peak demand for that category.

A general drawback of this measure is the use of across-the-board standards to accomplish the goal. A minimum/maximum approach narrows considerably the range of permissible parking (without obtaining a variance). But there exists a wide variability in parking demand between certain types of uses. Inevitably, special circumstances will arise which merit special requirements. These special circumstances, as the following discussion suggests, are likely to be frequent enough to make the variance process the rule rather than the exception and subvert the intent of the standard. The basic inflexibility of maximum standards must be compared with the more flexible site plan review process governed by policies and criteria to encourage less automobile use. Maximum-minimum standards also suffer by providing no direct incentives for developers to instigate programs to encourage alternative forms of transit.

Not all new developments will result in a situation where the parking supply permitted within the maximum-minimum standards leads to a supply restriction sufficient to induce change-of-mode. The actual demand for many offices, for example, will likely fall within the permissible range and the developers will have, by accident or design, provided sufficient parking.



The standards themselves would not distinguish between employee and customer/visitor parking. The proper ratio for each would need to be determined by the owner or property manager. Where supply is inadequate, there will be conflicting interests bearing on how much parking should be set aside for each type. In some cases, owners will choose not to establish specific employee parking restrictions; in others, they may designate enough parking to meet employee needs. In either event, they will effectively eliminate the deterrent value to employees, thereby shifting the inconvenience of finding a parking space to the customer.

Assuming that parking in new developments can be provided so that employee parking is less than demand, there remains the difficulty of determining who gets assigned spaces and who doesn't. This would be the responsibility of the owner/property manager. Where 15 to 20 tenants are involved, his ability to resolve the resultant disagreements and in-fighting will be sorely tested as individual tenants seek to maximize employee spaces available to them. Add to this the complications of overlapping parking requirements for shift changes, seasonal variability in employment, and continual turnover in tenants, and the problems facing the property manager become correspondingly more difficult to resolve.

Some, perhaps a good many, of those employees who do not get assigned to a reserved space in the employee parking area will still drive to work, parking in the customer area. If there is any excess parking in this area, as there likely would be to accommodate peak demand periods, then on many days there will be no incentive to enforce restrictions on employee parking in customer parking areas. Moreover, because many employees arrive before the customers, the customer is faced with the difficulty of finding a place to park on particularly crowded days, contributing incrementally to increased congestion and air pollutant emissions.

Perhaps most significant is the difficulty in limiting the availability of on-street parking to long-term parkers. Employers cannot force employees or customers to park on their lot (legally or practically) instead of on the public street. If off-street parking is unavailable, then they will look to the street for parking; hence the need for on-street parking restrictions. In most areas, on-street residential parking is available within 1/4 mile of the commercial zone. Since new commercial development is dispersed throughout the metropolitan area, on-street parking restrictions would have to be widespread to satisfactorily implement the intent of the measure, even though the total on-street parking pressure from the one or two new developments in an area may be relatively light. The political and administrative problems of on-street parking controls are discussed later in this paper.

In summary, minimum/maximum requirements do not necessarily restrict supply to the point of inducing change of mode. Demand at many developments will be within the supply of parking provided. Where shortages do occur, the inconvenience will often fall on the customers rather than employees; and even if some employees cannot get an off-street space, they should be able to park on-street since effective on-street parking prohibitions are difficult to establish given the dispersed nature of the new developments subject to the parking requirements. The low degree of effectiveness, together with its limited impact in the short and medium term, recommend against further consideration of this alternative strategy.

## Limit Supply Increases in High Traffic Generation Areas

This measure was originally proposed as an emission control measure in SRAPC's draft Air Quality Plan. It would prohibit any new parking spaces in and around the four regional shopping centers. Such a restriction could conceivably be applied to such other high auto use areas as colleges and major employers. The most appropriate means of implementation would be a General Plan Policy prohibiting parking supply increases on developed property within specified areas of high traffic generation. The premise of this strategy is that facility use will gradually increase over time, and parking spaces will remain constant or decrease. This will eventually lead to a parking shortage and induce people to change modes.

In regional shopping centers, the effectiveness of this measure is dependent on a parking shortage eventually developing, which is unlikely in the short or medium time-frame, if at all, since parking is presently adequate at the regional centers save during the Christmas peak. The measure does not distinguish between customers and employees. Since shoppers are much less likely to switch to a bus or carpool, the effectiveness of the measure will be limited. Increased congestion in the parking lot would tend to offset any emissions reduced by mode switching. Given that this measure as applied to regional centers does not meet criteria for effectiveness in reducing emissions in the required time frame and for focusing on home-work trips, it does not bear further consideration.

## Provide Exceptions to Parking Standards Under Specified Conditions

Four possibilities are identified in the initial list of measures. Three of these can be eliminated from further consideration as emission reduction measures applicable to suburban areas. The fourth - in lieu standards - is discussed in the following section.

Two possibilities involve a provision permitting developers to request parking below the minimum standard. The first possibility includes recognition of joint use opportunities with nearby developments. This provision may avoid the construction of unnecessary parking but would not induce anyone to shift to other modes of transportation and is consequently not consistent with the screening criteria.

The other possibility relates to specific requirements of developers who wish to provide more parking than a new maximum standard would permit. The developer would be permitted parking above the maximum only if he mitigated the extra travel generation and vehicle emissions through an "offset" program to reduce vehicle travel (typical in-lieu measures). For non-central city areas at least, this measure is superfluous since we have eliminated maximum standards as a viable parking management strategy.

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\* To make this prohibition applicable to undeveloped property as well would for all intents and purposes preclude commercial development in areas where residential use is inappropriate, with attendant equity and legal questions.



## Reduce Requirements in Lieu of Tradeoffs

The focus of this measure is the creation of an inducement--reduced development costs associated with relaxed parking requirements--in return for specific developer actions to encourage or promote other methods of commute than the auto. This approach better recognizes that parking supply restrictions can be most effective when they are directly linked with corresponding inducements to switch transportation modes. As an incentive program, it does not impose requirements on the private sector, but leaves it up to the developer to determine if the alternative improvements or in-lieu programs are workable for his particular development.

The types of in-lieu provisions might include credits for 1) providing bicycle lockers, enclosed and secure bike storage areas, or shower facilities; 2) incorporating bus turn-outs, shelters, or covered walkways to enhance the convenience of transit facilities; 3) designing the site so that bicycle and pedestrian access is convenient and separated from parking lot traffic; 4) offering subsidized bus passes to employees; 5) providing incentives for carpooling; and 6) contributing to a special capital fund for the purchase of transit vehicles. Whatever in-lieu provision is countenanced, it is essential that the cost of the in-lieu provision not exceed the net benefit afforded by the combined effect of greater permissible building areas and reduced parking space requirements/costs.

The extent to which commercial developers would avail themselves of these in lieu provisions is difficult to evaluate and must be speculative in the absence at this point of program specifics. A key requisite in the highly competitive commercial real estate field is the solicitation and securing of leases for a prospective development. While good location and access are the quentessential requirements, attractive lease terms, adequate parking and site aesthetics are also important. Developers will not be inclined to provide so little parking that it may jeopardize the leasability of a site, nor will they be inclined to impose parking charges or other restrictions which would discourage potential tenants. A second important requisite of commercial development is the attractiveness of the property to investors since at least 50% of new developments are sold to investors. Programs or requirements which would impose substantial or uncertain management costs may likely reduce the project's ultimate marketability. However, the ongoing cost of a transit pass subsidy program may well be inconsequential in comparison with the escalating cost of energy, utilities, and grounds maintenance. Finally, the newness and uncertainty of in-lieu provisions may prove a discouragement to some developers in an industry where the status quo of tried and true development practices is well entrenched. The degree of acceptance in the final analysis will most certainly be a direct function of the financial incentive provided.

Because the in-lieu standards would only affect post-1980 new developments which take advantage of the provisions, and since only a small percentage of single occupant drivers would be induced to switch, the impact of this measure is limited. A rough approximation is a diversion of .1-.2% of 1985 home-work trips. The impact would be more significant over the longer term. Nevertheless, minimal obstacles to implementation merit further consideration of in-lieu standards as an alternative measure.



## Require Use Permit for Commercial Developments

This measure would require that all new or redeveloped commercial developments obtain a use permit prior to issuance of a building permit. It would establish policies and criteria for reviewing commercial developments and recommending appropriate conditions. The justification for a use permit requirement is that commercial developments stimulate additional traffic and this in turn adds to the cumulative impact of traffic congestion, energy consumption, and air quality. The review process associated with the granting of a use permit would help to ensure that all reasonable measures are instituted to minimize trip generation and vehicle miles travelled. This is accomplished by attaching appropriate conditions to the use permit. Also, periodic review of the progress in implementing VMT minimization measures is facilitated by appropriate conditions on the term of the use permit.

Fixed parking requirements in the Zoning Code could be eliminated, but would not have to be; there is some merit to maintaining basic minimum requirements to serve as a "starting point" in negotiating site-specific parking programs. Rather, the developer would be required to submit data on the parking demand his facility would likely generate. Staff recommendations would be based on this data, plus demand studies previously compiled.

It should be emphasized that a use permit requirement would only apply to new commercial developments, or those existing developments which are being altered or modernized. Use permits would not be necessary for individual businesses as a pre-requisite to obtaining a business license prior to conducting operations in an existing building.

The Planning Department staff report to the Planning Commission would include information on:

- 1) Number of employees and total trips/day generated by the development.
- 2) Estimated parking demand of the development.
- 3) Present and planned transit routes, headways, 1/4 mile access population, and other relevant transit data. (Regional Transit to provide)
- 4) Appropriate transit amenities to be incorporated into project design. (Regional Transit to provide)
- 5) Bicycle access and amenities.
- 6) Appropriate pedestrian access and amenities.
- 7) Feasibility of transit pass subsidies.
- 8) Opportunity for preferential carpooling requirements.
- 9) Adequacy of proposed parking and opportunity for in-lieu reductions.
- 10) Potential on-street parking conflicts.
- 11) Parking lot design and landscaping.

Policies and guidelines would be developed to aid in the review of individual proposals. For example, a specified level of planned transit service may be desirable before requiring transit pass subsidies or access amenities. Similarly, certain street conditions or other bicycle access limitations may be identified in guidelines which would make more than minimal bicycle facilities unnecessary.

The use permit process has the advantage of flexibility in dealing with specific circumstances unique to each site. The resulting parking requirements are likely to more closely approximate the actual parking demand at the constructed development. Sites with little or no potential for alternative transit incentives would not be forced to comply with arbitrary and unnecessary standards. By providing for Planning Commission review, this strategy ensures that each development proposal goes through a public review process of potential ways to mitigate traffic generation. This keeps important issues in the forefront of deliberation on a project-by-project basis. If implemented, this process would also facilitate the potential for tie-in to policies which would prioritize commercial and other development based upon the relative VMT generated by projects. This program option is being considered as part of the County General Plan Update by prior commitment of the County in the adopted Air Quality Plan.

The effectiveness of this strategy is likely to be of the same order of magnitude as in-lieu provisions previously discussed, that is .1 to .2% of 1985 home-work trips. Because of the negotiated nature of the use permit provisions, as opposed to a completely voluntary in-lieu program, a use permit process is likely to have an edge in effectiveness. A problem that frequently occurs with the project-by-project implementation of similar policies is that exceptions are granted for developments with special circumstances, and these exceptions gradually tend to become the rule. ("We can't make him do that because we didn't make so and so do it . . .")

A use permit requirement for commercial developments does, of course, involve bureaucratic side effects. A fairly thorough staff review will require additional application processing time and generate the need for one or two additional staff persons. This cost would be recovered by billing the applicant for the appropriate cost of staff review. On the other hand, a development plan review process would reduce time and cost significantly, while insulating project proponents from unnecessary public criticism.

The principal benefit of the use permit strategy is the institutionalization of a process and policies for reviewing developments to promote alternative travel incentives, thereby fostering a greater awareness and commitment on the part of developers to single-occupant automobile alternatives. Reducing the amount of required parking is a part of this process, but not necessarily a means to an end. Effectiveness is a function of vigilance and diligence by staff and decision-makers in imposing workable conditions. But, it is inevitably limited by the small number of trips which potentially can be impacted.

Potential long-term effectiveness is much greater than the short and medium range. Implementation constraints are insubstantial. This strategy should be given further consideration as part of an overall package of parking management strategies. Much additional work is necessary to identify appropriate policies and guidelines.



## Establish Site Plan Review for Commercial Developments

This measure is similar to a use permit process with the major difference being Planning Department rather than Planning Commission approval. Again, fixed quantitative standards would be replaced with a flexible site plan review process to determine parking requirements for specific developments. The ordinance would set a range of permissible parking. The exact requirement would depend on the projected demand for parking and available alternative transportation access potential. As with the above measure, site plan review would be guided by specific policies and guidelines incorporated in the ordinance.

Actually, the Zoning Code presently requires site plan review for all commercial developments. The provision is not being enforced because the Planning Department cannot take on the workload without an additional staff person. Significant additional direction would need to be amended into the Zoning Code to implement this measure, however. The project applicant would have the right to appeal to the Planning Commission when design modifications or conditions are unacceptable to him.

The nature of site plan review limits its scope to the design features of a project--parking layout and efficiency, landscaping, pedestrian/bicycle access and amenities, etc. Program type considerations--transit fund contributions, bus pass subsidy programs, and carpool programs--are appropriately the scope of a public decision-making process.

The effectiveness of the site plan review process is more critically dependent on the capability of the staff people responsible for conducting the review than with other alternatives where public decision-making bodies are more actively involved. A stable, consistent, thorough, and well-reasoned review process is essential to negotiating realistic and effective design changes. It also helps to minimize inequities in the requirements imposed on similar commercial developments.

Given a capable staff, the site plan review process is likely to entail less bureaucracy, less cost, and less time than a use permit process. From the perspective of some, it is likely to represent less political maneuvering, less public visibility, and less hassle. The limitation of scope and limited opportunity for public participation represent the major drawbacks of this measure. In the absence of any more viable, stronger, more comprehensive parking management measures, however, this one remains available.

## Require Existing Private Lots to Meet Same Requirements as Imposed on New Developments

The retroactive application of new parking requirements and design standards to existing development is not permissible on the basis of past court decisions. However, it is possible and desirable to require existing private developments to conform to new requirements whenever a rezone, use permit, building permit (involving 50% of property's value, as defined by law) or other entitlement is requested. The in-lieu standard option, use permit, and site plan review process described earlier would all incorporate such a requirement, as would any other amendments to the design standards recommended as part of this study effort.



## Increase On-Street Parking Restrictions

Consideration of on-street parking controls is not viable as a parking management strategy on its own merits in the suburban area since off-street parking is plentiful. However, increased on-street restrictions may be necessary in conjunction with pricing control measures, or in localized situations where off-street supply is inadequate.

The City of Sacramento has identified six problem areas outside the Central City where existing parking problems might justify increased parking restrictions. All in East Sacramento or close to the Central City, they are Sutter Memorial and Mercy Hospitals, Sacramento Medical Center, DMV's offices, Sacramento City College, and Paradise Beach.

In Sacramento County, there are only a few areas where inadequate off-street parking has generated conflicts in residential areas. Residents near the federal office building on Cottage Way requested last year that "No Parking" signs be installed on their street, only to call for their removal after a total ban on parking proved too much of an inconvenience. Residents on Trimble Way near Kaiser Hospital have requested that the County adopt a residential parking permit program to keep Kaiser employees and patients off their street. The Public Works Department response to this request in a March 25, 1980 report to the Board of Supervisors was that the need for such a program does not at this time justify the considerable expenditure of funds and resources required to implement it. Other localized problems which have generated some complaints are found in the vicinity of McClellan Air Force Base, American River College, and Sunrise Mall.

If the City and County of Sacramento were to tax parking in such a way as to require employees to pay for off-street parking privileges, it would generate a substantial need for additional on-street parking restrictions. In fact, whether residential parking restrictions, if any, can be developed which are politically acceptable to the public represents an important prerequisite of implementing pricing control measures.

There are a number of methods that can be utilized to regulate parking under a residential parking program. They include residential permits, parking prohibitions, time-limit parking, parking meters, and visitor permits. The only county controls presently in force are the prohibition of parking on 60' or wider streets with four lanes. The appropriate mix of controls would depend on the specific needs of individual areas under consideration. A key aspect of the city's residential parking program is the establishment of controls, but only upon the petition of a minimum number of neighborhood residents, study and recommendations by the traffic department, and public hearings to determine the need for and acceptance of the controls. So far, the process has been initiated only for the Sutter Memorial Hospital area.

The cost of implementing a residential parking program would depend on the scale of the program and the types of controls implemented. The City of Sacramento estimates initial costs of between \$10,000 to \$274,000 and annual maintenance costs of \$5,000 to \$33,000 for each of 12 potential areas. The total initial cost totals \$1,200,000 and the annual maintenance cost amounts to \$184,000. The potential annual revenues, based on the installation of some 5000 meters, would come to \$730,000 and would generate a revenue surplus after 2 years. A similar program in the county would require establishing a new county administrative unit since the county presently has no parking control personnel.

No estimates are possible at this level of analysis of the total cost of a countywide residential permit program around commercial areas, but it is believed that it would be on the order of 1 to 2 million dollars.

The implementation of a residential permit program involves some inconveniences to residents. They must annually obtain a permit for their vehicles and pay a small fee to offset administrative costs. They must periodically obtain visitor permits for their guests, and they may have to occasionally hassle the enforcement personnel to deal with problem parkers. If residents are required to go downtown or to the Bradshaw offices to obtain their permits from the county, it will greatly add to the inconvenience. This may be alleviated by paying some local resident a modest sum to issue the permits and collect permit fees.

Existing sheriff and CHP patrol capabilities are not adequate, nor is their primary purpose to manage parking. Enforcement of parking permit programs will therefore require the hiring of additional personnel to patrol, issue citations, and if necessary, collect meter revenues. Provided that the effort is adequately staffed, enforcement should not represent any particular problems.

To summarize, an effective program to manage on-street parking where residential-commercial conflicts arise is possible provided residents are willing to put up with the minor inconveniences, and adequate enforcement capability is provided. The city presently provides residential parking controls in problem areas, but to date, the need does not exist in the unincorporated area for similar controls. Imposition of pay parking for employees in the suburban areas would create a widespread need for controls. On a countywide basis, the cost would be considerable. Revenues generated from a parking space tax could be used to offset the costs.

### Conclusions

The preceding analysis has endeavored in a albeit cursory fashion to examine the principal approaches to restricting parking supply outside the central city. It leads to a number of conclusions:

1. There is no adequate way to get at existing parking supply through this type of measure. The one strategy we could think of, licensing, is so draconian in its bureaucratic machinations as to put the most dedicated federal regulator to shame.
2. Remaining strategies concentrate on limiting supply in new development. This greatly limits their potential effectiveness, although some strategies have merit.
3. There is a certain inappropriateness to the concept of supply restrictions as a means to accomplish an end--VMT reduction. Basically, the approach relies on inconveniencing people into changing mode. This has ramifications in terms of traffic congestion and safety, raising the fundamental question as to whether the conscious policy decision to allow one measure of environmental quality to deteriorate in order to promote the achievement of another environmental quality objective (air quality) is a defensible course of action. Moreover, experience tends to show that efforts to indirectly prod the American public into doing something it doesn't really want to do succeed more than anything else in testing our ingeniousness at finding ways of circumventing those efforts.

4. The last three off-street supply measures analyzed--in-lieu standards, use permit requirements, and site plan review--do not seek to limit parking supply as an end unto itself, but rather to allow reduced requirements as a quid pro quo in providing incentives to leave the automobile at home on a reasonable and personally acceptable scale. The objective is to foster an awareness and acceptance of site designs which places less emphasis on the passengerless automobile and greater emphasis on more beneficent travel modes. Each of the three strategies represents a different review approach with the likely influence on ultimate site design correspondingly different. As such, they should be incorporated into different alternative implementation packages for more thorough evaluation.



DISTRIBUTION OF TRIPS BY TRIP TYPE  
1974 and 1985  
(In 1000's of Trips)

Trip Type		1974 TRAVEL			1985 PROJECTED TRAVEL <sup>1</sup>		
		To Cen- <sup>2</sup> tral City	To Other Dest.	Total	To Cen- <sup>2</sup> tral City	To Other Dest.	Total
H O M E W O R K T R I P S	Transit Passenger	10.1	10.8	20.9	28.9	15.3	44.2
	Auto Driver	87.2	311.3	398.5	78.3	431.0	509.3
	Auto Passenger	16.7	58.3	75.0	13.9	58.7	72.6
	SUBTOTAL	114.0	380.4	494.4	121.1	505.0	626.1
N O N H O M E W O R K T R I P S	Transit Passenger	8.1	17.5	25.6	16.5	25.4	41.9
	Auto Driver	187.6	1562.3	1749.9	173.4	2130.2	2303.6
	Auto Passenger	54.5	548.1	602.6	45.4	703.8	749.2
	SUBTOTAL	250.2	2127.9	2378.1	235.3	2859.4	3094.7
	TOTAL	364.2	2508.3	2872.5	356.4	3364.4	3720.8

<sup>1</sup> Assumes a 475-500 bus fleet; bus fares to remain at 25 cents (1978) in constant year dollars; gas and parking costs to increase 15% and 3-1/2% annually over and above inflation, respectively.

<sup>2</sup> Includes Richards Boulevard industrial area.

## D. DISCUSSION OF SUBURBAN PRICING MEASURES

### The Attractiveness of Paying for Parking

The pricing approach to parking management has two potentially attractive features, at least from the perspective of a beleaguered planner trying to conceptualize feasible ways of achieving a more balanced transportation system. First, if drivers must pay for parking, they will reassess their trip-making options and perhaps choose cheaper means of travelling which incur less social cost. And, if the collective price they pay is channelled into programs which fully promote more efficient trip-making, expand alternative transportation opportunities, and develop other incentives for alternative means of travelling--then the basis for a rational and cohesive transportation policy begins to emerge.

The economic logic underlying a parking tax or other mechanism of parking pricing is basically one of equity. The cost of providing parking is heavily subsidized, particularly in the suburbs, but also in the Central City. Businesses, seeking to maximize their competitive attractiveness in the post World War II climate of prosperity and rapid growth, found it relatively easy to absorb the cost of land and parking space construction in the land-cheap urban fringe. The American public, eager to embrace the actual and psychological freedom that the private car offered, did not exactly object to the idea. Now, abundant free parking is an accomplished fact in almost all areas developed since 1950.

Recently, the cost of constructing a parking space has reached about \$750, and the potential building area sacrificed to parking sells for up to \$60 per square foot for top commercial property. The subsidy to parking is no longer inexpensive, but it is an accepted way of doing business.

More important are the social costs associated with parking in an auto-reliant community: dependence on petroleum energy, immense consumption of natural resources, major source of medically and economically deleterious pollutants, and increasingly frustrating and inefficient traffic congestion which has strained road-building budgets to the limit. Such costs are difficult to quantify, but they are of no small magnitude. Indeed, the risks of this country's dependence on petroleum are sufficient to jeopardize the continued survival of our economic system, a worry that has been increasingly expressed by thoughtful individuals in recent months. Recouping some of these costs with a parking pricing mechanism while at the same time promoting at the local level goals which are of high national, state, and local priority is therefore a way of reducing the present inequity in transportation pricing.

The reality of the whole matter is that people are not likely to view their paying for parking as significantly contributing to these goals. Rather, parking charges represent an additional expense which contributes to the drain on individual resources.

## Sorting Out the Measures

As in the case of supply restriction measures, it is necessary to distinguish between those applicable to the Central City and those applicable to suburban areas. But it doesn't necessarily mean that the measures appropriate to downtown can be considered apart from suburban-oriented measures. It may be comparatively easier to increase the cost of Central City parking (because so much of it is presently paid parking) than it is to implement a pricing mechanism in the suburbs. To do one without the other, however, only adds to the inequity currently in effect between Central City and suburban communities. This increases the competitive advantage of dispersed suburban commercial development when business location decisions are undertaken. Provided that a measurable impact did materialize, it would be contrary to the objective of downtown revitalization (a process well underway), and seems inconsistent with the concept of concentrating new development in the most dense employment center where existing transit service capability is most effective.

The remainder of this discussion focuses on parking measures relevant outside the Central City. Table III-2 summarizes the various pricing measures identified for analysis. Key measures in the suburbs are those directed at private off-street spaces. They can be easily characterized by the order of their severity: voluntary measures, incentives, new taxes, and edicts.

### Voluntary Parking Pricing

This measure would leave it up to individual businesses or property owners to institute monthly charges to employees for off-street parking. It is difficult to conceive of this approach being effective in view of the entrenched notion of free parking, likely strong employee resistance, and lack of any real incentive to establish parking charges other than the government saying it would be a nice idea if you did. Those few firms that did try to impose parking charges would likely find many employees opting to park on the street instead. Unless this created a significant on-street residential parking problem it is unlikely that on-street parking would be restricted to employee use. This measure is not recommended for further consideration.

### Tax Incentive to Impose Parking Fees

This measure goes one step further by offering an inducement to establish parking fees. The only current tax from which some sort of exemption or credit would seem to be appropriate would be the business income tax. A statewide tax, this strategy would require State Legislature approval. Since it would reduce state revenues to promote additional charges on individuals it would likely have rough sledding in the Legislature. This measure is not recommended for further consideration since it is beyond local government ability to implement.



TABLE III-2

## CLASSIFICATION OF PRICING MEASURES

OFF-STREET PARKING			
PRIVATE		PUBLIC	
1. Voluntary Parking Pricing by the Private Sector	S,C	1. Establish Rate Structures to Discourage Long-Term Commuter Parking	C
2. Tax Incentives to Impose Parking Fees	S,C	2. Revise Method/Basis of Setting Rates	C
3. Parking Use Tax	S,C		
4. Parking Space Tax	S,C		
5. Parking Space Tax With Tax Credits	S,C		
6. Require That General Public Pay for Parking	S,C		
7. Require That Employees Pay for Parking	S,C		

ON-STREET PARKING			
PRIVATE		PUBLIC	
N/A		1. Revise Charges for On-Street Spaces	S,C
		2. Increase Penalties, Enforcement for Violations of Parking (14)	C

S = Applicable to suburbs  
 C = Applicable to Central City

## Parking Use Tax

The most common form of a parking tax is a parking use tax. It is applicable to charges for the actual use of parking spaces in the form of a tax on receipts for pay parking. There is some limited experience with this tax, all in central city environments. It is not considered here since no mechanism in the suburbs exists for collecting the tax.

## Parking Space Tax

This tax would be applied to the operators of all free and paid commercial parking lots in the County, that is, to the individual or entity responsible for carrying out such normal functions as the assigning of spaces to individuals or companies, the establishment of rules and restrictions on the use of the parking facilities, the collection of parking fees, if any, and maintenance of the facility. The tax would not be applied directly to property and would not be an express tax on property improvements. As a new tax, it would require 2/3 approval of voters subject to the requirements of Proposition 13.

Some basis for equitably distinguishing between small and large parking facility operators is necessary. A tax based on the size of the facility, as determined by the number of parking spaces, would appear to be the most reasonable approach.

The number of parking spaces in the County which would be subject to the tax is not known precisely. The number of spaces in commercially zoned property in the unincorporated area has been estimated to approximate 318,000. Including an additional 35,000 spaces in the Central City, and allowing for the rest of the City and unincorporated industrial tracts, the total number of taxable spaces is probably between 500 and 600 thousand. A precise inventory would take about a year to complete and cost in the vicinity of 150,000 dollars. Responsibility for collecting the tax would be delegated to the County Treasurer's Office. Annual collection costs are not known at this time, but they are not likely to be excessive.

As a source of funds for transportation system management programs, a parking tax would be excellent. A \$50 per space annual levy on an assumed 500,000 taxable spaces would yield about 25 million dollars. This money would primarily fund the operating costs of an expanded transit system. It could conceivably also fund such additional programs as an advertising campaign to promote trip-reduction planning, expanded carpool and vanpool programs, assistance to businesses in developing transportation planning programs, administrative costs of a residential parking permit program, and the like. Further study effort would need to be undertaken to more precisely determine revenue potential and appropriate programming for funding.

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\* Defined as the greater of 1) the number of marked spaces or 2) the total paved, gravelled or dirt area commonly used for parking divided by 350 square feet.

\*\* Includes government and public spaces.

Legal issues associated with this tax do not appear to be insurmountable. It is reasonable to expect that a court challenge of the measure's constitutionality would follow its approval by the voters. Insofar as most operators of parking facilities in the County are the property owners and the number of spaces are an indirect measure of the value of improvements, it could be claimed that the tax is a defacto property tax and hence prohibited under the terms of Proposition 13. A second potential legal issue is whether a parking space tax can be applied to commercial properties while specifically exempting residential parking providers. The degree, therefore, to which the implementing legislation makes explicit the distinction in purpose and in applicability of a tax levied on the purveyors of commercial parking vs. a tax on the property itself will in large measure determine the legality of the legislation.

The acceptability of a parking space tax at the polls is probably the most significant implementation constraint, but it is one which faces all tax-related measures. A key to public acceptability is whether or not the public perceives the tax to be essentially a business tax or whether they expect to have to bear the cost directly. There were several reasons for the November 1979 failure of Measure C, which called for a 1/4% sales tax increase to fund Regional Transit. One of them was undoubtedly the direct and highly visible impact of the tax, particularly its regressive effect on lower and middle income families.

Whether or not the parking tax will get passed on to the user, and if so in what form, is therefore a question of central importance. The first question to consider is whether the parking facility operator can pass on the cost to his tenants. For the purposes of this discussion, it is assumed that the parking facility operator will be the owner of the commercial property or his designated property manager. In the case of owner-occupied buildings, there is no problem. But that is not the case with most commercial developments in the County. Most tenants are under lease terms which specify a fixed rent over a specified period of time. Many are long-term leases. Newer leases have renewal and renegotiation clauses, which allow owners to pass on escalating utility and maintenance costs. Owners cannot pass on the tax to their tenants until the lease either expires or is renegotiated. The owner must therefore disproportionately bear the costs of the tax over the short-term. Owners with principally short-term leases would be better favored than the long-term lease holders. One way of softening this impact would be to graduate the tax over a 5-year period, increasing it each year to an intended level.

A parallel question is whether the increased operating costs incurred by a parking tax will be passed on to tenants in the form of overall rent increases or whether some separate fee or charge will be applied. It is assumed for a number of reasons that the first case will prevail. To begin with, commercial leasing is a highly competitive business requiring owners to provide the most attractive terms possible. Commercial lessors would undoubtedly be very reluctant to directly charge for parking for fear of putting their facility at a competitive disadvantage with other commercial centers. Also, increases in property taxes, utility charges, and other operating costs have traditionally been absorbed into the rent structure. A separate charge or fee based on some measure of the parking demand generated by each tenant would be difficult to accurately determine, would add to bookkeeping costs, and would increase confusion in understanding rent terms.



This generates a certain degree of inequity, since rents are usually in terms of square feet of gross leasable floor area, and total square footage is not the only measure of parking demand. A furniture store, for example, is likely to generate considerably less parking demand for its total area than does a bank or restaurant. But because it covers more floor area, it will pay a disproportionately larger share of the rent increase necessitated by the parking tax.

As is evident from the above discussion, the impact of a parking tax on individual businesses will depend on several factors. Among them are: 1) the amount of the tax, 2) the physical size of the business in relation to the total number of parking spaces associated with its commercial complex, 3) sales volume of the business, and 4) the term of the business lease. Data is not readily available to assess the impact on a wide variety of businesses. Preliminary figures concerning Florin Mall indicate that the tax on 5500 spaces would generate a \$.25/sq. ft. increase in rent, which, based on estimates of total sales volume, would translate into an across-the-board increase in prices of 1/3%. Similar calculations for the non-major tenants at Arden Fair suggest a \$.44/sq. ft. rent increase and 1/2% increase in prices. Presumably the same order of impact will prevail for other commercial areas as well.

Finally, there is the question of the equity of the impact of a parking space tax. Local government ordinances have for many years required that substantial off-street parking be provided. In some cases, the required parking has been well in excess of the actual demand, in other cases, it has proved inadequate. Commercial developers have responded by providing the required parking and, where necessary, more than was required. If the electorate decides to tax parking spaces, it will, in the interest of furthering one set of governmental objectives, be establishing a "penalty" for those developments which provided ample parking under another set of governmental objectives. The greater the surplus parking, the greater the penalty. The older development with only minimal parking will incur less of a tax liability. A secondary impact of the tax may be to induce further commercial development on excess parking spaces, or perhaps efforts to convert some unneeded parking into landscaping.

The foregoing analysis indicates that legal and political constraints to a parking space tax exist, but they are not insurmountable. The tax could generate significant revenue for expanding alternatives to automobile use. It is not likely to be passed on directly to users, but gradually will be absorbed into the price structure in the form of higher prices. By itself, the tax will not act to induce individuals to drive their cars less; its direct impact on emission reductions will not be significant. The value of this measure lies in its providing funds to make other emission reduction programs effective. On this basis, it is recommended for further study.

#### Parking Space Tax with Credits

This measure is very similar to the previous one, with the added dimension of tax credits incorporated into the implementing legislation which would encourage parking lot managers to implement specific objectives. Two principal credits would be available:

1. A maximum 50% credit for all parking fees levied and collected directly from employees or other long-term users of the lot, provided that the minimum fee is not less than \$20/month or \$1/day for single occupant commuters, and not more than \$5.00 for carpools of 2 or more individuals.
2. A credit for the subsidized portion of any bus pass subsidy program established by the parking lot manager.

To understand how this strategy might work, consider a corporate investment firm which owns a small retail shopping center and maintains responsibility for its 100 parking spaces. Assume a basic parking space tax of \$50/space. If the firm continues to provide free parking for all its tenants and institutes no other programs to encourage alternative transportation arrangements, its tax liability would be \$5000. If it requires that all employees who drive by themselves and park in the parking lot pay \$20/month, and if 10 employees sign up for monthly leases, then the total potential credit is  $\$20/\text{month} \times 12 \text{ months} \times 15 \text{ employees} = \$3600$ . Since the maximum credit is \$2500, then his tax liability after computing the credit would be  $\$5000 - \$2500 = \$2500$ . If the firm offers to pay \$5 of the cost of a bus pass and 8 employees regularly buy his passes, then the additional credit would be  $\$5 \times 12 \text{ months} \times 8 \text{ employees} = \$480$ .

This measure maintains the advantage of providing a substantial source of revenue to fund alternative transportation programs. It provides a fairly strong incentive for parking lot owners/managers to pass on the tax directly to users. This in turn provides a disincentive for employees to continue to use their single occupant automobile to get to work while further encouraging carpooling and transit ridership. Of all the measures identified in the report, this has the greatest potential to achieve significant reduction in automobile trips and pollutant emissions. If effective, this measure could probably induce a 20-25% reduction in all home-work trips by single occupant automobiles.

Legal constraints to this measure are much the same as for the previous alternative. Its implementability is dependent upon 2/3 vote approval. Because many voters would be faced with the potential of paying for what is now free parking, its acceptability at the polls is doubtful. Voters would need to be convinced of the importance of and need for the tax, prepared to confront the inconvenience of residential parking permit programs, and willing to accept a commitment to alternative travel arrangements. That is a lot to expect from 2/3 of the electorate.

Furthermore, there are a number of impacts and problems associated with this measure. To begin with, not all parking lot owner/managers will be able to avail themselves of the credit provisions. Some may have entered into lease agreements which stipulate that they shall provide free parking. Other industries and businesses which own their own property and manage their own parking may have labor union agreements which provide for free parking (Sacramento County, for example, has made labor guarantees that no parking fees will be charged at the Bradshaw complex). There is therefore the potential of certain inequities in the effect of the tax due to circumstances unrelated to the tax itself. The number of businesses which would be restricted in one way or another is not known at this time, but indications from experienced commercial leasing agents are that free parking is rarely stipulated in the lease terms.



A second problem facing parking lot owner/operators is the imposition and enforcement of a parking space lease program. They must first be able to designate a separate user area or areas for employee parking. They must identify who the employees working in the lot are, and (for enforcement purposes) what cars they drive. They must develop a way of collecting monthly parking fees from employees who park on the property, either by payroll deductions, levies on tenants who then collect from employees, or direct billing of employees. They must set up a bookkeeping procedure and allocate personnel to administer the program. And finally, they must be able to enforce the parking policies and prohibitions necessary to effectively administer the program. This requires 1) running a DMV check on employee lists to verify license numbers, 2) periodic patrolling of the lot to identify non-existent carpools or to identify employees with no assigned spaces who are regularly parking on the property, 3) the authority to tow away consistent violators, and 4) the willingness to use such authority.

For non-owner occupied small commercial and office facilities, the problem is that there is oftentimes no person or manager regularly on the property to ensure enforcement and conveniently administer parking leases. It will probably be necessary to hire a security firm to periodically check the premises for employees attempting to circumvent payments. For large facilities, particularly the regional shopping centers, the size of the site greatly complicates enforcement. Employees arriving late in the day can simply park with the 2000 or so shoppers, making it much more difficult and time consuming to ferret them out.

The impact of this alternative on tenants is similar to the previous alternatives. The remaining tax liability of the owner/operator will eventually be passed on to tenants in the form of higher rents. This will be passed on to consumers in the form of higher prices. Because some of the tax liability is underwritten by employees, the net impact would be less than if a tax without credits were instituted. Certain businesses which require employees to use their cars in the course of their jobs may also find it necessary to either pick up some or all of the cost of the employee's parking fee or buy/lease company vehicles. In a similar vein, many firms may be faced with pressure on the part of labor unions for the business to pick up the cost of employee parking. If this becomes a widespread practice, it would defeat the whole intent of the tax credit program, and at the very least, impose an inequity on unrepresented employees in other occupations.

The impact of this measure on employees who drive to work is obvious. For those who can join a carpool or take the bus, the financial impact will be mitigated. But there remains a significant number of workers who will find it difficult to arrange for alternative transportation, either because their working hours are strange or variable, because they need to use a car while at work, or because they live where public transportation is not readily available. Until revenue produced by the parking tax yields new busses and expanded service, the transit system will be inadequate to serve much of the working population. In the absence of free parking elsewhere, this group of workers will be forced either to work out more innovative transportation arrangements, get assistance from their employers, ante up the \$20, or cheat. For the lower income families, the impact could be severe, forcing families to cut back on basic necessities. For middle and upper middle income families, the impact will be less severe, but will nevertheless require many to cut back on expenses for things they really would rather not give up.



Initially at least, the first choice of most workers faced with the prospect of paying for parking will be to seek nearby free on street parking and walk the extra two, three, or five blocks to work. The downtown experience bears this out, with surveys indicating that as many as 30% and 28% of County and State workers respectively who drive to work park on the street. This inevitability increases conflicts with adjoining residential uses. Residential parking permit programs can reduce the conflicts, but as explained elsewhere, they involve a certain level of enforcement hassles and inconvenience. Apathy and neighborhood opposition to parking permit programs may be sufficient to circumvent on-street controls in some areas. In others, total demand may not justify imposing controls. The result will inevitably be uneven application of on-street parking restrictions over time.

In some areas, it will be relatively easy to find free on-street parking; in other areas of high employment density, more extensive controls will make it difficult. This will provoke frustration and anger on the part of workers who perceive an inequity in the way the system influences them. One thing for certain, public hearings before the Board of Supervisors and City Council regarding the establishment of parking permit programs in given neighborhoods are likely to involve upset people and acrimonious debate.

One problem regarding administration of a tax credit provision is the verification of claims for tax credits. Parking lot operators will be required to submit evidence of having established monthly parking fees. Because it would be fairly easy to fabricate such evidence, some fraudulent tax credit requests will not doubt be submitted. Periodic auditing will be necessary to minimize false tax reports. A major commitment would also be necessary to implement and enforce parking permit programs and commercial street frontage parking restrictions. Existing parking programs in the city could expand to accommodate the added workload, but a new administrative section would need to be established within the County Traffic and Engineering Division of the Public Works Department. No estimate of the workload requirements is possible at this level of analysis. Fines and fees would offset some of these costs; the remaining costs would be made up from parking space tax revenues. To ensure that administration costs are kept within reasonable limits, it would be advisable for the implementing legislation to specify a percentage limit on administrative expenditures.

The above comments are not intended to be an exhaustive analysis of the impacts of a parking space tax with tax credit provisions. Nevertheless, they point to some major problems with this strategy which may, in the long run, make it ineffective as a stimulus to change transportation modes: the inability or unwillingness of some parking lot operators to establish parking fees, the pressure on individual businesses to assume all or a major portion of the parking fee, the availability of free on-street parking nearby and the likelihood that necessary on-street parking restrictions will be unevenly applied. This measure will have a financial impact on those who must drive a single-occupant automobile, and provides no subsidy or exemption for those wage earners least able to absorb the financial impact. Lastly, it places city and county decision-makers in the middle of a hearing process (to establish parking permit programs) which pits disgruntled workers against angry residents. This combination of factors considered against the requisite 2/3 majority vote for its implementation makes it inadvisable to pursue further study of this strategy at this time.

### Charge the General Public for Parking

This measure would involve passage by the city and county of an ordinance requiring the installation of parking meters or automated fee parking in all private parking lots above a certain size. As a pricing measure, it falls under the category of an edict. The property owner would be required to pay for and install the necessary hardware. Minimum hourly and/or monthly rates would be specified by ordinance. Property owners would eventually recoup their costs out of parking revenues.

This measure applies to all drivers, not just home-to-work trippers, and is inconsistent with the preliminary screening criteria. The constitutional basis for this use of the police power to directly regulate the fee structure of private parking lots would most surely be challenged, perhaps successfully. The inflationary impact of the measure would be substantial. As an inducement to less automobile use, this measure is unparalleled. The problem is, it doesn't provide any means to make other transportation modes more available. Its political feasibility is nil. No further consideration of this measure is recommended.

### Charge Employees for Parking

This is a similar measure to establish a parking fee by edict, applicable only to employees. A city-county ordinance would require employees or employment centers above a certain size to set aside employee parking areas and issue monthly permits at a specified rate. Employees who maintain a bonifide carpool would qualify for free or a 75% subsidized rate. Exceptions would be incorporated into the ordinance to exempt certain groups, such as those who normally finish their shift after 9:00 p.m., handicapped employees, drivers who commute in company-owned vehicles, and the like.

Many of the same problems concerning the prior two measures are applicable here. Although no revenue would be generated for transportation system improvements, no 2/3 vote of the electorate would be necessary either. Widespread disregard of the ordinance would probably result in the absence of stiff government enforcement. No political feasibility. No recommendation for further consideration.

### Charge for Public On-Street Parking

With the exception of Metropolitan Airport and CSUS, there are no on-street meters in Sacramento County outside the Central City. The essential question phrased by this measure, then, is: should parking meters be installed on selected public streets near commercial areas as a means of either restricting free parking access or raising revenue?

To begin with, metering on residential streets severely restricts the convenience of residents on those streets. Residential parking permit programs are more appropriate and more palatable to residents than metering. This leaves commercial frontage on non-arterial streets (on-street parking is generally prohibited on arterials) as potential candidates for metering.

A program intended primarily to raise revenues is of dubious merit. Meters would be spread over a wide area, installation and collection costs would be higher than the typical Central City costs and meters would likely be under-utilized in the absence of off-street parking charges or supply restrictions. Based on previous analysis, neither of these measures is recommended for further consideration.

### Conclusion

The evaluation of suburban pricing measures leaves us with only the concept of a parking space tax, and that measure requires a 2/3 vote of the people for implementation.



## E. STRATEGY/MEASURE PACKAGES FOR SUBURBAN AREAS

The following list includes parking management measures for suburban areas which "survived" the screening process; the measures are packaged in accordance with the system discussed earlier in this chapter.

Package I: can be implemented unilaterally by City, County, or State with minimum cost

Strategy 1: Provide incentives for alternative travel modes

Measures:

1. Require, through zoning ordinance, a minimum level of secure bicycle parking facilities for employees.
2. Require a minimum level of secure bicycle parking facilities for general public (customers).
3. Require, through zoning ordinance and improvement standards, transit amenities such as bus turnouts and shelters (including bicycle racks where appropriate) when specified criteria are present.

Note: Incentives above minimum requirements could be done voluntarily by business and industry (Package V), or negotiated as part of parking lot review process (Package III).

Strategy 2: Reduce emissions through better parking facility design

Measures:

1. Amend standards to improve parking lot access and interior flow.
2. Increase landscaping requirements (little, if any, air quality improvement, but desirable for aesthetic and community design reasons).
3. Allow greater percentage of parking spaces to be sized for compact cars (little, if any, air quality improvement, but desirable for more efficient use of land and to provide greater flexibility in parking lot design).

Package II: measures which require close coordination between City, County, or State, but involving minor costs

None.

Package III: can be implemented unilaterally by City, County, or State with more significant costs

Strategy 1: Restrict or alter supply of parking

Measures:

1. Require a use permit for all commercial and office development.

2. Institute staff level development plan review for all commercial and office development (alternative to Measure 1).
3. Adopt enabling ordinance for residential preferential parking program, to be implemented if other adopted measures lead to overflow parking in residential areas.

Strategy 2: Provide incentives for alternative travel modes

Measures:

1. Continue providing arterial bicycle corridors for commuting.
2. Reorient Bikeway Plan from "recreation" to "commuting" orientation.

Package IV: measures which require close coordination between City, County, or State, with more significant costs

Strategy 1: Increase the cost of parking

Measure:

1. Place a measure on the ballot (jointly with the City of Sacramento) which would institute a tax on parking spaces, with revenues from the tax allocated to alternative transportation programs, particularly improving transit service (high initial cost, to be recovered out of first year's revenues from the tax).

Strategy 2: Provide incentives for alternative travel modes

Measure:

1. Fund and appoint a public information officer to develop and implement employer outreach and media programs to promote alternative methods of transportation (jointly with the City of Sacramento).

Package V: measures which require active voluntary participation of the private sector to be effective

Strategy 1: Restrict or alter supply of parking

Measure:

1. Reduce parking requirements with "in-lieu" tradeoffs (inducements to use other modes of travel) (voluntary alternative to the use permit or development plan review measures in Package III).

Strategy 2: Provide incentives for alternative travel modes

Measures:

1. Employer provides ridesharing incentives (such as guaranteed parking space) to employees.

2. Employer permits flex-time for employees to facilitate carpooling and bus ridership.
3. Employer provides transit pass discount to employees.
4. Employer allows portion of parking lot to be used by general public as a place to leave cars while riding bus.
5. Employer provides additional secure bicycle parking areas to employees and to customers.
6. Employer provides shower facilities to employee bicyclists.
7. Employer provides information packets to employees to promote alternative transportation methods.
8. Employer contributes to capital fund for transit service improvement.

Note: These measures could be proposed voluntarily by a developer as a tradeoff for reducing parking requirements or proposed voluntarily by a developer without reducing parking requirements. If a mandatory use permit or development plan review process is instituted (Package III), these measures are the kind that would be negotiated as part of an overall parking program for each development.

Package VI: measures contingent on actions or services of institutions other than City, County, or State

Strategy 1: Increase the cost of parking

Measure:

1. Place measure on ballot to institute a parking space tax (requires 2/3 vote of the people); also appears in Package IV.



#### F. STRATEGY/MEASURE PACKAGES FOR THE CENTRAL CITY

The following packages of parking management measures for the Central City were put together by the City Planning staff, and are subject to further screening by the City. They are included here so as to put the entire parking management program into proper perspective.

##### Package I: unilateral implementation by City, County, or State using minor resource allocations

##### Strategy 1: Restrict or alter the supply of parking measures

###### Measures:

1. Prohibit on-street parking during morning peak-commute hours at 2-hour limit spaces.
2. Place moratorium on single-occupant monthly permits at centrally located City, County, State off-street facilities.
3. Gradually reduce existing single-occupant monthly permits at high demand, centrally located lots through non-renewal.
4. Space reservation for short-term parkers at high demand, centrally located lots during morning peak-commute hours.
5. Oversubscribe monthly permits.
6. Implement carpool verification plan.

##### Strategy 2: Increase or alter the price of parking

###### Measures:

1. Replace maximum daily parking charges with hour-for-hour rates in City, County, State off-street facilities.
2. Institute a sliding scale for hourly parking rates.
3. Reduce the discount over daily rates provided to non-carpool monthly permits.
4. Develop pricing zones as a function of demand for off-street facilities.

Strategy 3: Incentives for alternative transportation modes

1. Preferential parking for carpools at off-street facilities.
2. Monthly permit rate reductions for carpools at lots.
3. Space guarantees for short-term parker at off-street facilities.
4. Provide flextime to City, County, State employees.
5. Establish bike fleet for inter-office use.
6. Contract for bicycle messenger service for local deliveries.
7. Provide bus tokens to employees for local business travel.

Package II: cooperative implementation by City, County, or State using minor resource allocations

Strategy 1: Restrict or alter the supply of parking

Measure:

1. Prohibit on-street parking along newly constructed or realigned thoroughfares which have been designated as bicycle corridors.

Strategy 2: Incentives for alternative transportation modes

Measures:

1. Provide bicycle maintenance facilities for employees at existing City, County, and/or State vehicle maintenance facilities.
2. Establish a cooperative for employee bicyclists at existing City, County and/or State vehicle maintenance facilities for bicycle maintenance.

Package III: unilateral implementation by City, County, or State using major resource allocation costs

Strategy 1: Restrict or alter the supply of parking

Measures:

1. Implement residential preferential parking program in the Central City.

2. Augment preferential parking program with on-street space reservation for carpool permit parking; if meters exist, convert to 10-hour limits for all day parkers; implement enforcement program similar to Washington, D.C.'s.

Strategy 2: Incentive for alternative transportation modes

Measures:

1. Increase the supply of Class I, Class II, and fenced enclosure bicycle parking for City, County, and State employees and for the public.
2. Establish high security bicycle parking devices along existing bus routes for commuters and shoppers to park-and-ride.
3. Provide shower facilities for employee bicycle commuters.

Package IV: cooperative implementation by City, County or State using major resource allocation costs

Strategy 1: Restrict or alter the supply of parking

Measures:

1. Establish a maximum level for parking requirement standards.
2. Establish a small car mix for parking requirement standards.
3. Allow substitution of parking requirement standards with in-lieu programs.
4. Explore replacing fixed quantitative parking requirement standards with a conditional use permit and public hearing process.

Strategy 2: Increase or alter the price of parking

Measures:

1. Increase fines for parking violations.
2. Allocate revenue from increased fines to transportation/parking management programs.



Strategy 3: Incentives for alternative transportation modes.

Measures:

1. Prioritize bikeways construction in terms of commuting potential and relationship to Regional Transit corridors.
2. Continue support to CalTrans Ridesharing Project.
3. Develop multi-media information package.
4. Establish amenity requirement standards for alternative transportation modes.

Package V: voluntary implementation by the private sector

Strategy 1: Restrict or alter the supply of parking

Measure:

1. Reduce the amount of single-occupant monthly permits at privately-owned public parking facilities and at employee parking facilities.

Strategy 2: Restrict or alter the price of parking

Measure:

1. Establish a sliding scale for hourly rates at privately-owned public parking facilities.

Strategy 3: Incentives for alternative transportation modes

Measures:

1. Provide monthly permit rate reductions to carpools at privately-owned public parking facilities and at employee parking facilities.
2. Provide space guarantees to carpools at privately-owned public parking facilities and at employee parking facilities.
3. Provide flextime.
4. Investigate vanpool or subscription bus services.
5. Contribute to employee monthly bus pass.

6. Provide secure bicycle parking facilities.
7. Provide bicycles for local job-related travel.
8. Contract for bicycle messenger service for local deliveries.
9. Continue involvement with the CalTrans Ridesharing Project.

## CHAPTER IV

### DESIGN CONSIDERATIONS

This chapter addresses design considerations from two perspectives, (a) improving the efficiency of vehicular movement within parking lots, and (b) providing amenities which serve as inducements to use modes of travel other than the single occupant automobile. While the supply management and pricing measures discussed in the previous chapter involve, in essence, disincentives to travelling via single occupant automobile, the recommendations contained in this chapter include measures which maintain and enhance the choice of travel modes available to the individual. For comprehensiveness, other appropriate recommendations are included which may have no bearing on air quality.

The chapter includes three major sections: (a) design for bicycle and pedestrian amenities, (b) design for transit amenities, and (c) other design issues. Recommendations for parking lot landscaping are included in the following chapter.

#### A. DESIGN FOR BICYCLE AND PEDESTRIAN AMENITIES

Transportation and parking are rapidly becoming major issues in the Sacramento area, not only because of the diminishing fuel supply and high prices, but also because of air quality and land utilization concerns.

With these concerns in mind, it seems important for local governments to begin exploring alternative transportation modes and to encourage their use by providing for the appropriate amenities. One such alternative is the bicycle, which is rapidly growing in popularity and has proven itself as a convenience and economical means of transportation.

In downtown Sacramento, some government offices have already begun providing for this demand by installing bicycle parking enclosures or lockers. The CalTrans facility at 11th and N Streets is generally used to full capacity, with some overflow of bicycles being chained to the fence which encloses the 85 bicycle racks.

In addition to bicycle parking facilities, womens' and mens' lockers and shower rooms are provided with 150-160 clothing lockers, all of which are being used with a 40-50 person waiting list. It is estimated that bicycle ridership increased 200% upon installation of these amenities.

The State Department of General Services also manages a total of 65 bicycle lockers at different state buildings in the downtown area. All of these lockers are in use, and a 25-person waiting list for vacancies has been prepared.

Presently, city and county ordinances require vast amounts of vehicle parking spaces which in effect guarantee each motorist a parking space, while most times the bicyclist is not even assured a post or a tree to which he or she may lock a bicycle using a personal chain and lock. Because bicycles are so susceptible to theft, it is crucial that adequate, secure parking be provided; fear of theft is a major deterrent to bicycle ridership.



This situation appears rather discriminatory, especially in light of the monetary aspects. The average cost of providing vehicle parking is approximately \$800 per space. A 1972 study found that a simple car parking lot can easily run over \$1,500 per space, whereas the average cost of secure bicycle parking ranges between \$100-\$250 per bike, and bicycles use only a fraction of the space needed by a car. These are only two of the immediate benefits of bicycle transportation. When looked at more closely, the list goes on. Among other benefits are: (1) aids in air pollution control measures, (2) reduces traffic congestion, (3) reduces energy consumption, (4) frees land for more productive and aesthetically pleasing uses, (5) contributes to improved public health, and (6) reduces personal transportation costs.

With this information, local governments, with foresight, should begin a policy of assuring adequate, secure bicycling facilities; the following recommendations are made as a step in that direction, including:

1. Minimum requirements of developers and employers to provide bicycle parking.
2. Allow for variability from the minimum requirement where appropriate.
3. Allow for consideration of trade-offs of vehicle parking spaces for additional bicycle spaces and/or shower and clothing locker facilities.

#### Recommendations

A. Applicability. Pedestrian and bicycle amenities shall be provided and maintained in accordance with the following provisions:

1. Bicycle parking facilities shall be provided for:
  - a. All new commercial, office, or industrial developments.
  - b. All new schools and civic buildings.
  - c. All other new development, i.e., churches, community centers, recreational facilities.
  - d. All transit system park and ride lots, and transfer stations.
  - e. New multi-family residential developments, except where enclosed garages are provided.
  - f. Any alteration or expansion of existing development where entitlements from local government are required, such as use permits, variances, and rezones.
2. New developments with a minimum requirement of 200 vehicle parking spaces shall provide bicycle lanes from the street right-of-way to the bicycle parking area.
3. Pedestrian walkways shall be provided from the street right-of-way to the buildings as well as from the bicycle parking areas to the buildings.
4. No fee may be collected for the use of bicycle facilities unless a fee is also charged for vehicle parking, and in such case may not exceed 10% of the vehicle parking fee.

B. Variances. Should a developer feel that a particular site does not warrant bicycle or pedestrian facilities, a variance may be requested. Possible factors for consideration may be:

1. Site far removed from urban area.
2. Traffic and roads such that they discourage bicycle use at the present and in the foreseeable future.
3. Nature of the development discourages bicycle use.
4. Public transit not available at present or in the foreseeable future.

C. Bicycle Parking Facilities

1. Types of bicycle facilities

a. Class I: Lockers or check-in (Figure 1).

- 1) lockers: a completely enclosed box with locking doors, usually holding two bikes and accessories in separated compartment.
- 2) check-in: a room or enclosed area under the supervision of an attendant.

a) Pros:

- (1) highest security
- (2) best weather protection
- (3) rider carries only a key
- (4) best suited for long-term use

b) Cons:

- (1) highest cost

b. Class II: A Class II rack is defined as one which locks the bicycle frame and both wheels, with the user providing only a lock. The rack should provide a protective shield over the padlock to prevent cutting of the shackles with a bolt cutter. (Figures 2, 3).

1) Pros:

- a) less expensive than locker
- b) medium security
- c) can be installed close to building entrance and within public view

2) Cons:

- a) user must provide lock
- b) less weather protection
- c) accessories not protected
- d) more complicated to use

c. Class III: Stationary object.

1) Pros:

- a) cheapest
- b) can be placed close to building entrance and within public view.

2) Cons:

- a) cement slab and verticle bar types can damage wheels and frame
- b) not possible, or at least more difficult, to lock both wheels and frame
- c) less weather protection
- d) no protection for accessories against theft or vandalism
- e) user must provide cable and lock

2. Minimum Requirements

- a. Employees: employee bicycle parking faciiliites shall be Class I or enclosed Class II.
- b. Patrons: Class II racks are required.
- c. Numerical Requirements: bicycle parking requirements shall be calculated on a percentage basis of the required vehicle parking.

1) employees            4%

2) patrons            3%

3) exceptions:

- a) dinner restaurants/cocktail lounges:

2% employees            0% patrons

- b) recreational facilities:

3% employees            4% patrons



TOP VIEW  
10 LOCKERS  
20 BICYCLES

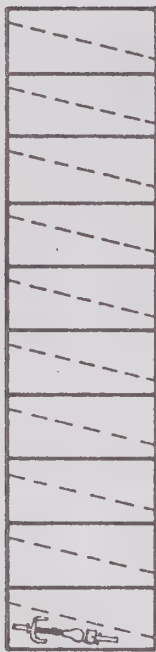


FIGURE 1  
CLASS I BICYCLE LOCKER

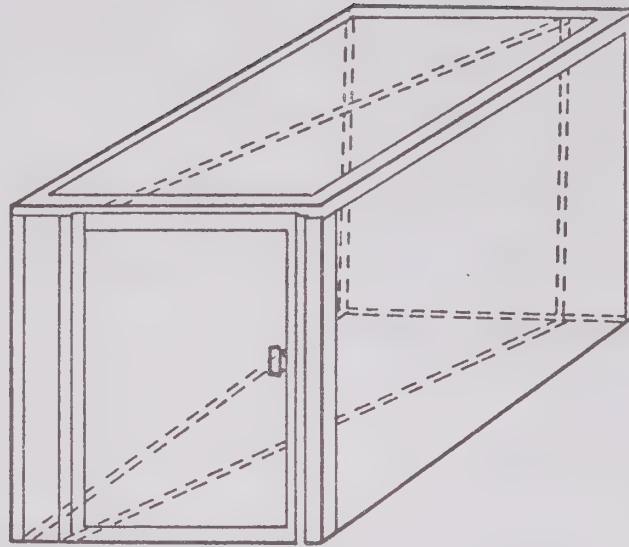


FIGURE 2  
CLASS 2 BICYCLE RACK  
"RALLY RACKS"™

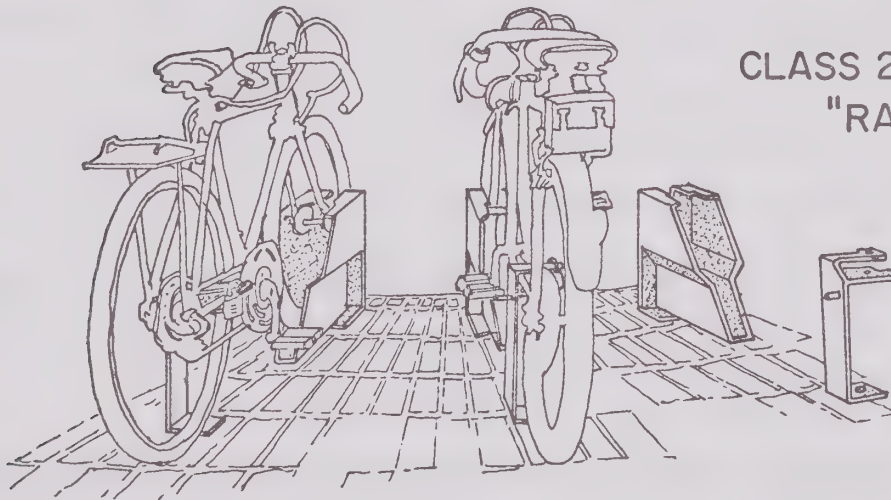
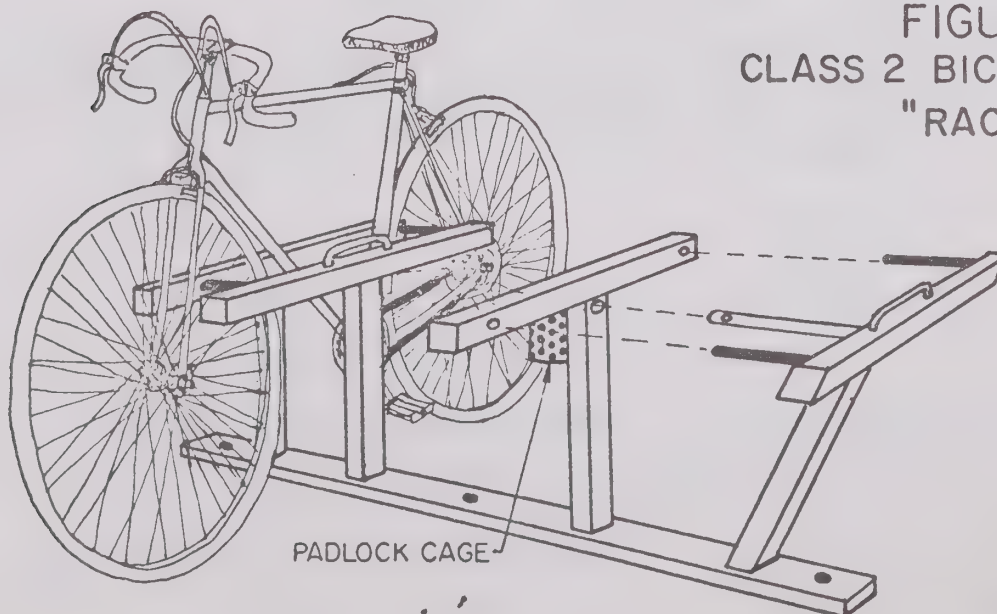


FIGURE 3  
CLASS 2 BICYCLE RACK  
"RACK III"™



c) schools: 40% Class III

d) heavy industrial:

4% employees

0% patrons

e) multi-family residential: 1 bicycle parking space for every 2 units, Class I or enclosed Class II, except where enclosed garages are provided

f) in no case shall there be fewer than two employee bicycle spaces and two patron spaces unless specifically exempted

d. Design Standards.

1) general criteria

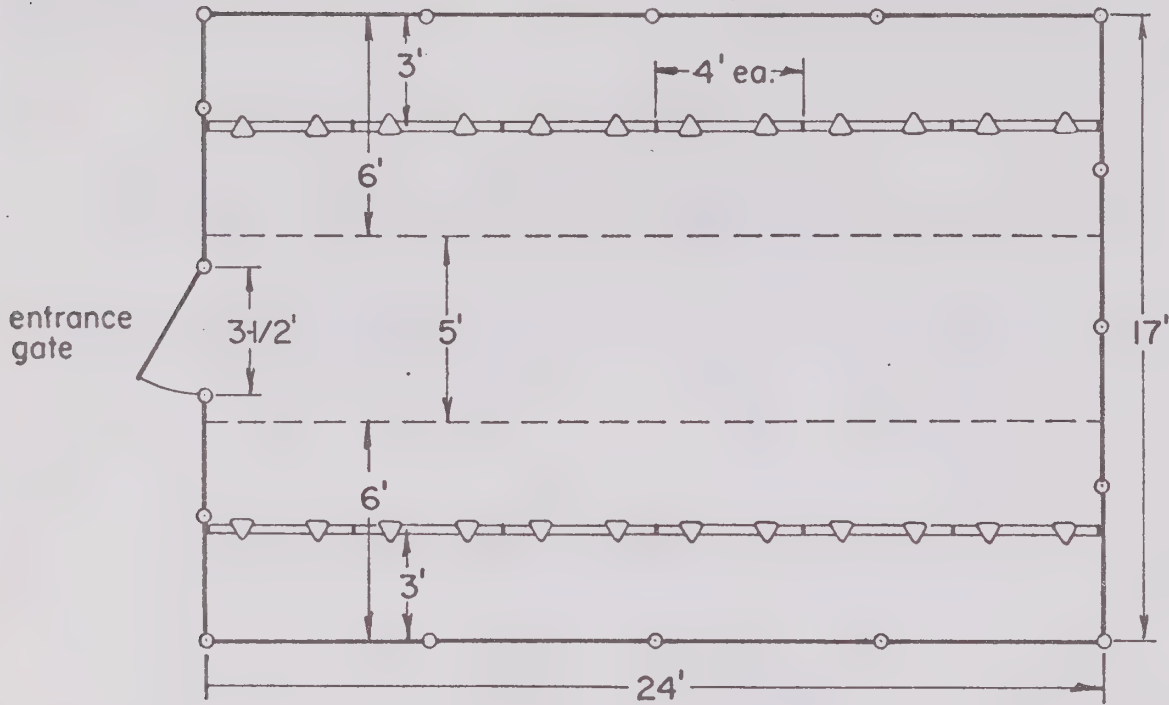
- a) ability to fit all standard bicycles
- b) simplicity and ease of operation
- c) ease of identification
- d) conservation of space
- e) harmonious design with surrounding area
- f) adequate structural strength and security
- g) should be vinyl coated to protect frame and finish
- h) shall be protected from weather by awning or overhang
- i) area shall be well lit

2) design specifications (Figures 4, 5)

- a) installation of the racks shall allow adequate spacing for easy access to the locking device between the racks when occupied, and between the occupied racks and adjacent walls, trees, posts, or other stationary objects. Allowances shall be:
  - (1) 2-1/2-foot width allowance per bicycle
  - (2) 6-foot length allowance per bicycle
  - (3) 5-foot maneuvering space between bicycles or lockers, and adjacent walls, fences, etc.
- b) employees parking facilities:
  - (1) developments with a requirement of 6 or more employee bicycle spaces shall enclose the area within a 6-foot high chain link fence

# ENCLOSED BICYCLE PARKING FACILITIES

24 BIKES



SCALE  
3/16" = 1'-0"

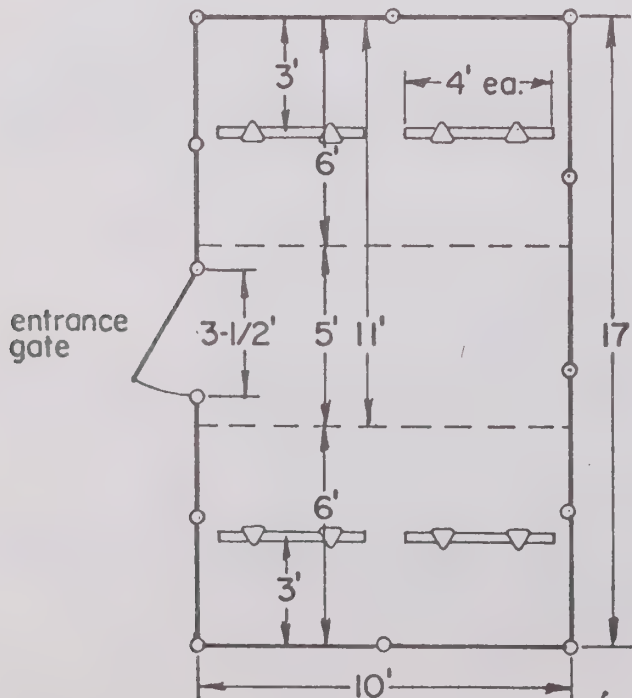
## SPECIFICATIONS

### ALLOW:

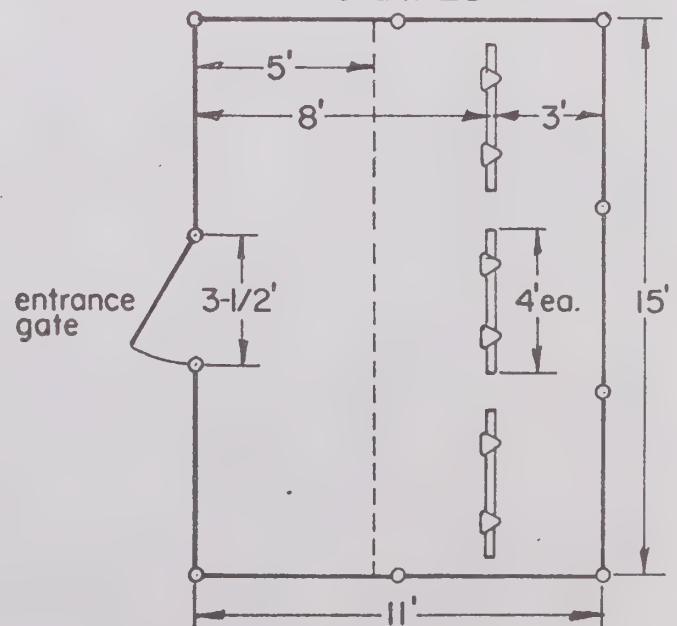
- 6' BIKE LENGTH
- 2' BIKE WIDTH
- 5' MANEUVERING SPACE

FIGURE 5  
ENCLOSED BICYCLE PARKING FACILITIES

8 BIKES



6 BIKES



SCALE  
3/16" = 1'-0"



FIGURE 6  
BICYCLE AND PEDESTRIAN AMENITIES

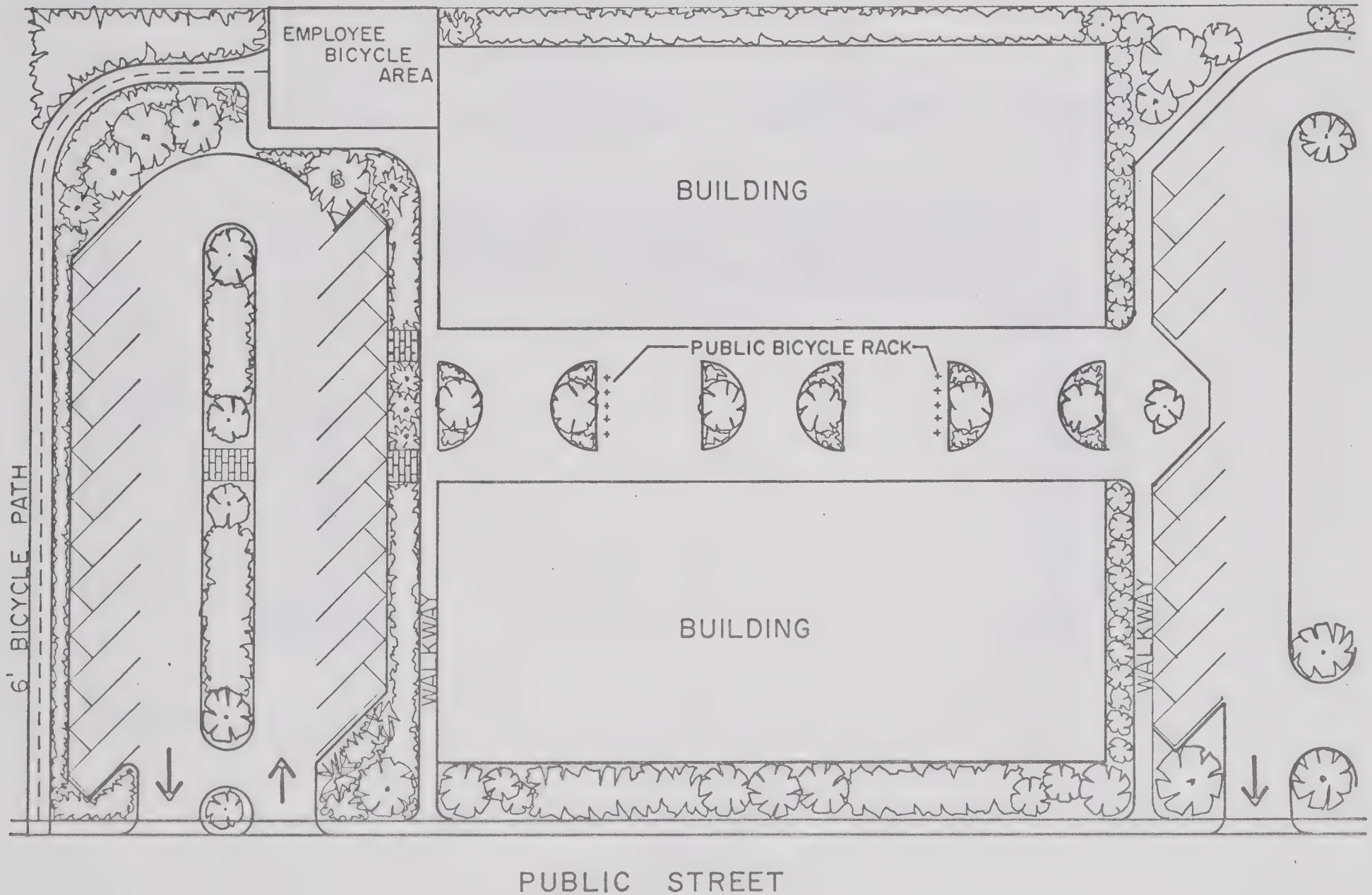


FIGURE 7  
BICYCLE AND PEDESTRIAN AMENITIES

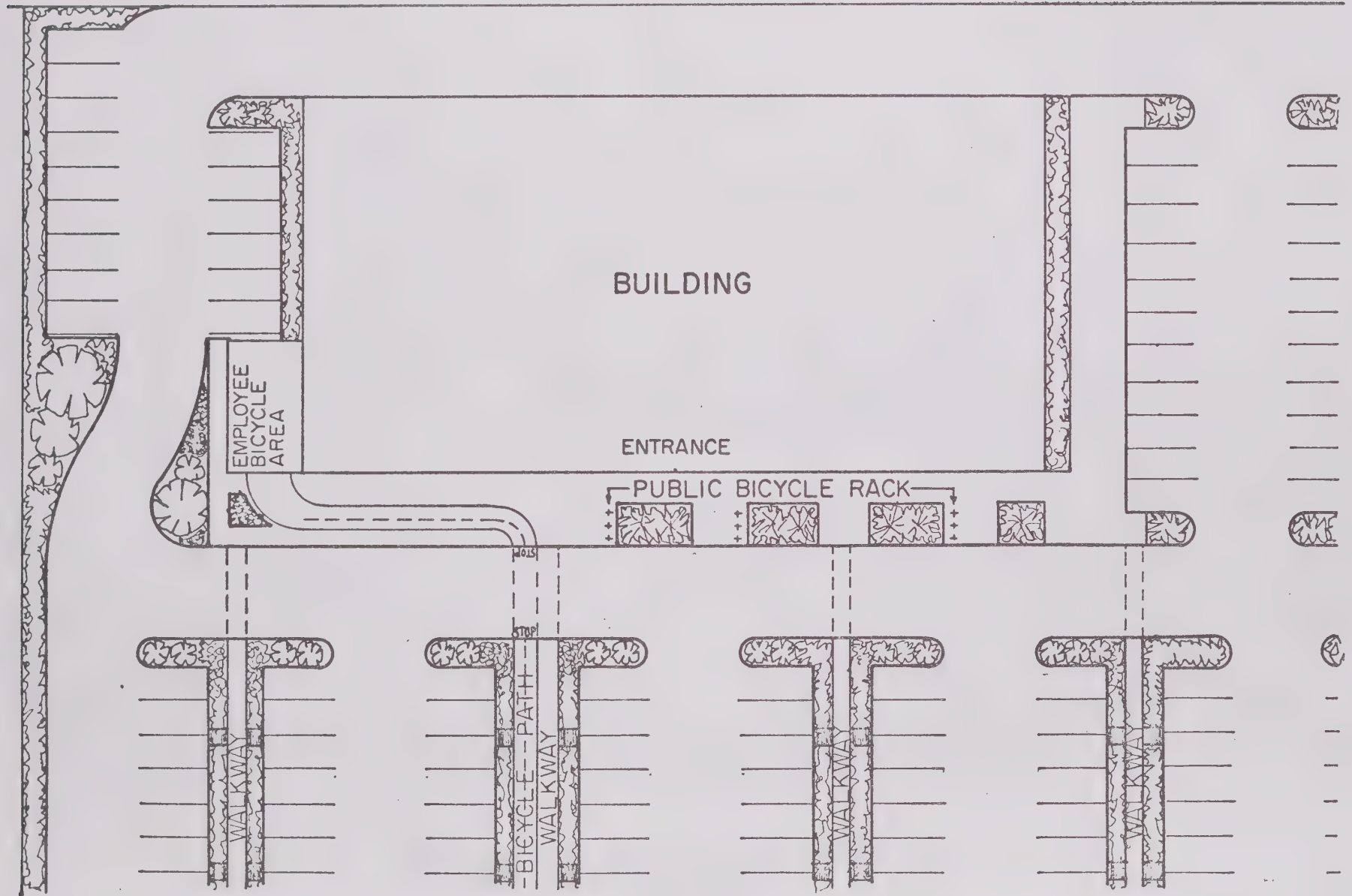
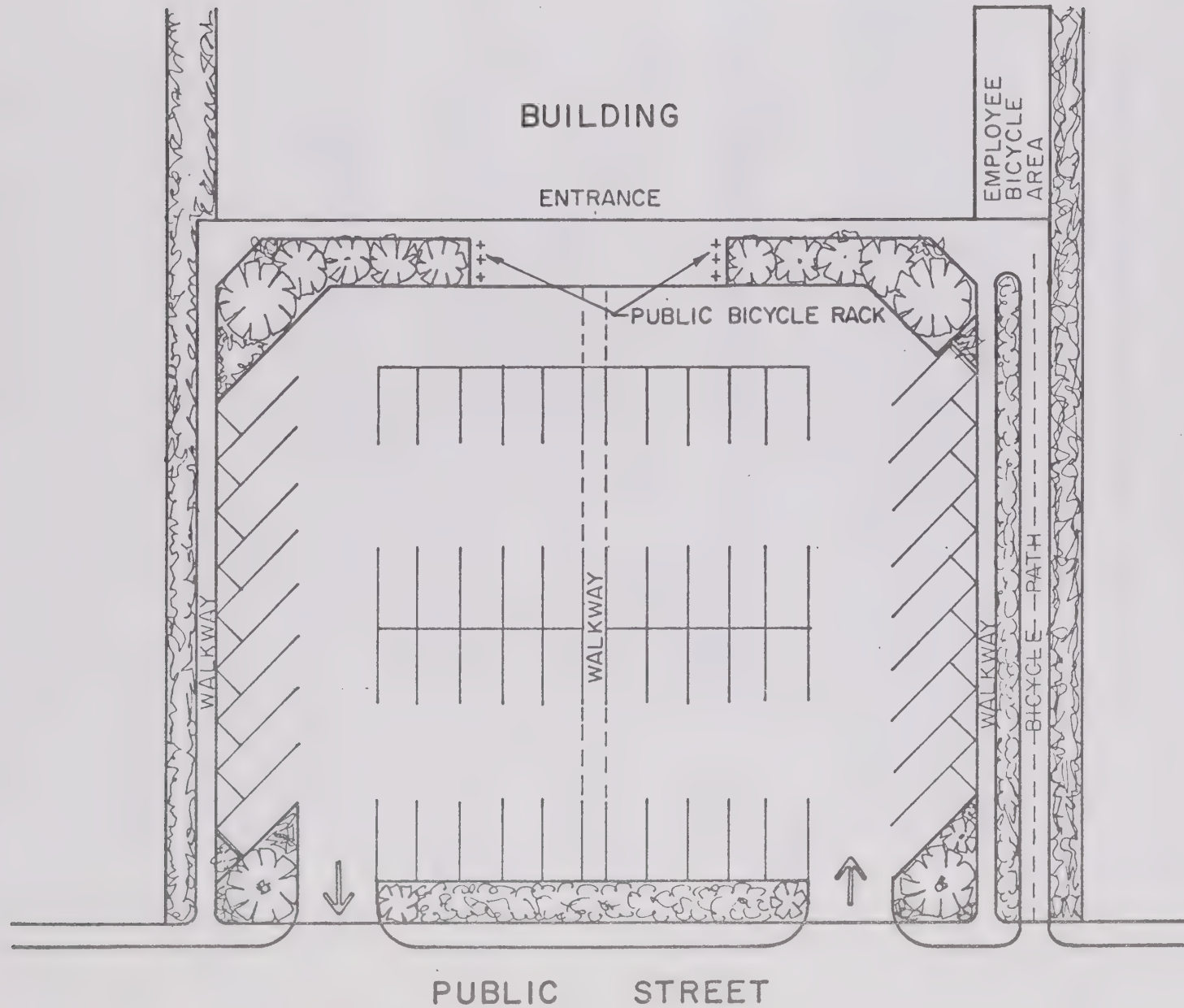


FIGURE 8  
BICYCLE AND PEDESTRIAN AMENITIES





- (2) the bicycle area shall be kept locked with keys issued only to the cyclists and the building manager
- (3) the ground area shall be covered with the same surfacing material as the vehicle parking lot, or a 4" thick concrete slab
- (4) lockers are exempt from fencing requirement

#### D. Shower Facilities for Bicyclists

1. Developments with 100 or more employees may consider providing shower and clothing locker facilities for their bicycle commuting employees, as an in lieu provision for a reduction in vehicle parking spaces. Vehicle parking may be reduced by at least 5 spaces; further reductions may be considered based upon the number of shower stalls proposed, the number of secure bicycle parking spaces proposed the anticipated level of employment, and the accessibility to the site by bicycle.

#### E. Bicycle Lanes Internal to the Development (Figures 6, 7, 8)

1. Bicycle lanes from the street right-of-way to the bicycle parking area shall be provided where a minimum of 200 vehicle parking spaces are required. Provisions are:
  - a. The surfacing of the bicycle lane shall be a smooth, solid, dust and mud free material suitable for bicycle travel.
  - b. The minimum width shall be six feet excluding any area for vehicle overhang.
  - c. The bicycle lanes shall be so designated and divided by a dashed line.
  - d. Lighting shall be provided.
  - e. Curbing or landscaping shall be used to separate the lane from both vehicle and pedestrian thoroughfares and vehicle parking areas.

#### F. Pedestrian Walkways (Figures 6, 7, 8)

1. Pedestrian walkways shall be provided from the street right-of-way and from bicycle parking areas to the appropriate buildings. Provisions are:
  - a. Lighting shall be provided.
  - b. The minimum width shall be 4 feet excluding any vehicle overhang.
  - c. Shall be constructed to standard county sidewalk specifications.

Acceptable Brands Include:

1. Class II

A. Rally Rack 200 or 300

Rally Enterprises, Inc.  
Box 299  
Sonoma, CA 95476

B. Rack III

Rack III  
3661 Grand Ave.  
Oakland, CA 94610

2. Class I

A. Bike Lokr

P.O. Box 445  
West Sacramento, CA 95691

Cost Estimates:

Lockers or Racks

Class I - \$100.00-250.00 per bicycle  
Class II - \$25.00-\$160.00 per bicycle  
Class III - \$0-\$20.00 per bicycle

Fencing - ranges between \$1.32 per foot installed with a 3-1/2 foot gate  
and \$8.37 per foot installed with a 4 foot gate

Paving - 2" AC > \$1.25 to \$1.75 per sq. ft.  
4" AB

Additional costs of shower and locker room provided (estimates from  
CalTrans):

1 hr/day - janitorial time

1 hr/day - secretarial time

no estimate - water and electricity

## References

1. Art Funamura, California State Department of Transportation, Bicycle Studies Division, 1120 N Street Sacramento, California.
2. Bob Peterson, California State Department of Transportation, Building Manager, 1120 N Street, Sacramento, California.
3. Jim Baetge, Capitol Bicycle Commuters Association, Sacramento, California (916) 445-8023, P.O. Box 1541, Sacramento, California 95807.
4. Metropolitan Bikeway Master Plan, Lane Council of Governments, Eugene-Springfield, Oregon.
5. Orcutt, Fred L. Jr. and Walker, Hollins A. Jr., "Traffic Engineering for Pedestrian Safety," Transportation Engineering, January 1978.
6. Mike Bullock and Ellen Fletcher, "Bicycle Parking, Policy Recommendations for City and County Government," 1979, Santa Clara Valley Bicycle Association, P.O. Box 662, Los Gatos, California 95030.
7. Protopappas, John J. and Anderson, Joseph, "The Bicycle Parking Link, A timely look at bicycle parking ordinances and facilities." Bicycle Forum, fall 1978.
8. Steven McHenry, Bicycle Parking, A Design Manual. Baltimore County Bikeways Task Force, 111 West Chesepecke Avenue, Towson, Maryland 21204.
9. A Manual for Planning Pedestrian Facilities, Department of Transportation, Federal Highway Administration, Washington, D.C. 20590, June 1974.
10. Mike Shelton, Department of Transportation, Division of Highways, 1120 N Street, Sacramento, California 95814.



## B. DESIGN STANDARDS FOR TRANSIT ACCESS

The purpose of this paper is to establish standards for the construction and design of transit-related street improvements and passenger waiting facilities. Studies have indicated that increasing transit access through improved transit facilities can be a motivating factor in determining modal choice. Improvements are desirable to provide both comfort and convenience to transit users and increased safety to passengers and motorists. It is hopeful that transit amenities will provide incentives to potential riders and improved service and mobility to all transit users. Other advantages may be accomplished through transit improvements and include:

- Community benefit from a more efficient, safe transit network
- On-property or nearby amenity may assist the developer in the property sale or rental
- Convenience and attractiveness of a tenant's business to employees and/or patrons

Not all aspects of improved transit access are advantageous. Since additional amenities are expected to increase ridership, the already-burdened transit system might be further strained. Regional Transit, however, welcomes and encourages amenity provisions by developers now, with the expectation of increased service in the future. The cost to provide transit facilities and amenities adds to the development cost. Compared to the overall project cost, however, these costs are relatively small. (1980 cost estimates are \$3,500 for a typical 5' x 10' shelter and \$4,800 for a 5' x 10' shelter with bicycle racks. A bus turnout generally costs less than \$3,200.) The maintenance cost for amenities can be reduced if construction materials are low-maintenance and durable. Another potential problem may be equity in allocation of the amenity cost to the developers within the area. A fair system of cost allocation could alleviate most conflicts regarding this problem.

Residential and commercial expansion is expected to generate increased trips within that area. A developer should be responsible for assuring that transportation needs of future owners, tenants, employees and/or patrons will be met. Developers are presently responsible for providing street and sidewalk sections as well as parking areas. Land dedications and exactions for transit amenities insure that additional provisions for improved transportation to the development are furnished. Mandatory contribution of land, money, and facilities places part of the capital burden on the development responsible for increased demands on the system.

The design recommendations provide criteria for various types of transit amenities for both commercial and residential areas. Specific dimensions were based on a 60' articulated bus size since Regional Transit anticipates the use of these longer vehicles for all types of service. The standards are applicable within Sacramento County in areas where transit service exists or is proposed to operate in the future.

Types of transit amenities and facilities may vary from a bus stop bench to a large bus shelter with bicycle racks at a turnout. The highest level amenity is neither appropriate nor desirable for each bus stop. Amenities should reflect the potential ridership in both level and design. The following recommendations were developed with this objective in mind.

#### Present General Applicable Ordinances and Standards

1. Section 66475.2 of the State Subdivision Map Act. There may be imposed a requirement of dedication or irrevocable offer of dedication of land within a subdivision for transit facilities such as turnouts and shelters if the subdivision has potential for 200+ units as indicated on the General Plan, or contains 100+ acres, and transit services will be available within a reasonable time.
2. Zoning Code, Sections 301-14 and 335-13 as summarized below.
3. County Improvement Standards, Sections 4-13 and 4-17 as summarized below.
4. County Code, Section 10.32.030 as summarized below.

#### Recommended Ordinance Amendments

##### A. BUS SHELTERS

###### Present Standards

1. Bus Shelter Location (Section 301-14 of Zoning Code).

Installed at a location approved by the Sacramento Regional Transit District. Bus shelters are a permitted use in any zone.

2. Building Specifications (Section 301-14 of Zoning Code).

###### a. Composition

- 1) Aluminum frames and panels with Alcoa bronze duranodic finish or equal.
- 2) Roofs of bubble-type construction.
- 3) Wall panels of transparent materials, either tempered glass or plastic.

###### b. Dimensions

- 1) Size shall be approximately 6 feet in width, 10.5 feet in length and 8 feet in height. Shelters may be sized in multiples of these dimensions except for the 8-foot height.

###### c. Exceptions (Section 301-14 of Zoning Code).

- 1) Other designs and other construction materials may be used provided the design and materials are first approved by the Project Planning Commission.

d. Bus Shelter Signs (Section 335-13 of Zoning Code).

Allows one non-illuminated sign which does not project from the structure. The sign may have a maximum area of 30 sq. ft. (for basic shelter size of 6' x 10.5').

Recommendations

1. Location

- a. Required at those locations meeting any of the criteria listed below in Table IV-1 and at other locations as determined by the Director. Shelters shall be located at bus stop sites approved by the Sacramento Regional Transit District.

TABLE IV-1  
LOCATION AND SIZE CRITERIA  
FOR BUS SHELTERS

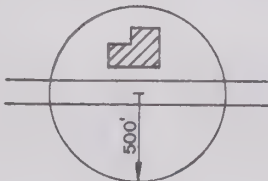
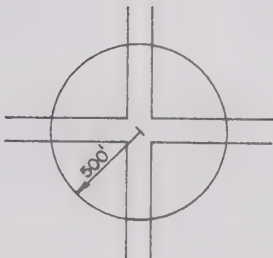
	Commercial Industrial Shelter Size		Residential Subdivision Shelter Size	
	50 sq. ft.	100 sq. ft.	50 sq. ft.	100 sq. ft.
A. If passenger boarding data is available				
- Boarders per day at bus stop near elderly residential or activity center	40+	80+	40+	80+
- Boarders per day at bus stop	50+	100+	50+	100+
B. Number of parking spaces required according to County Standards				
- Single development or development area within 500' radius of street intersection or building in question	250+	500+	N/A	N/A
				



TABLE IV-1 (Cont.)  
LOCATION AND SIZE CRITERIA  
FOR BUS SHELTERS

	Commercial Industrial Shelter Size		Residential Subdivision Shelter Size	
	50 sq. ft.	100 sq. ft.	50 sq. ft.	100 sq. ft.
C. Number of employees				
- Single development or development area within 500' radius of street intersection or building in question (see above diagram)	250+	500+	N/A	N/A
D. Number of acres	N/A	N/A	100+	200+
E. Number of units	N/A	N/A	200+	400+

b. Bus shelters with bicycle racks shall be installed at the following locations.

- 1) All shelters serving residential areas. Shelters with bicycle racks along a bus route shall not be less than one-half mile apart in residential zones.
- 2) All shelters at shopping centers.
- 3) All shelters at designated or informal park-and-ride locations.
- 4) At other locations as required by the Director.

c. Special Conditions

- 1) Other circumstances regarding the site area may be factors in determining the necessity for a shelter or the optimal type to be constructed. These may include:
  - Nearby bicycle paths and bicycle accessibility to the site.
  - Size and location of nearby shelters.
  - Availability of a protected, accessible, sheltered area which is part of the development.

## 2. Construction Specifications

### a. Dimensions

- 1) A minimum 50-square-foot covered area shall be provided at the applicable locations listed in Table A. (Typical size: 5' x 10'). (See Exhibit "A")
- 2) A minimum 100-square-foot covered area shall be provided where required as listed in Table A. (Typical size: 5' x 20'). (See Exhibit "B")
- 3) Structure height shall be from 8' to 10'.

### b. Curb Clearance

Shelter shall allow a minimum 4' clearance between the shelter and the curb. Where a sidewalk of 6' is required, the shelter shall allow a 6' clearance. The shelter shall conform to the County visibility ordinance.

### c. Ground Clearance

Shelter shall be built in or fastened and supported with a 6" (inch) clearance between the concrete pad and structure.

### d. Composition

- 1) Structure composed of rustproof metal, concrete or masonry.
- 2) Roof composed of rustproof metal, concrete or timber or translucent glazing materials and able to support a load of 40 psi.
- 3) Transparent glazing materials on all wall panels to allow maximum visibility. Transparent glazing materials shall be either 3/8" thick tempered glass panels or lexan plastic material, or equivalent.
- 4) Shelter shall be of earth-toned color.

### e. Concrete Pad

- 1) Non-slip concrete at least 4" thick.
- 2) Extend at least 1' around shelter edges.
- 3) Shelter with bicycle racks placed at rear shall have a 4' allowance on sides and a minimum 9.5' extension from shelter back to allow for bicycle rack installation and maneuvering space.
- 4) Shelter with bicycle racks placed on sides shall have minimum 9.5' extensions on either side to provide racks and maneuvering room.

### f. Lighting

Shelters shall be provided with light fixtures at locations where necessary.

g. Seating

Bench(es) at least 6' long for 50 sq. ft. shelter and 12' long for 100 sq. ft. shelters shall be installed.

h. Public Information

Vandal proof display case containing appropriate maps and schedules which can be periodically changed shall be installed in shelter so as not to obstruct view of on-coming buses.

i. Entrances

- 1) A minimum 6' entrance or two 3' entrances on 50 sq. ft. shelters shall be provided.
- 2) A minimum 12' or two 6' entrances on 100 sq. ft. shelter shall be provided.
- 3) Shelter may eliminate entrance wall if adequate wind screen is provided.

j. Structure location

- 1) If located adjacent to a building, there shall be a minimum 6" clearance between the shelter and the adjacent building wall.
- 2) Shelters shall be located near the head of the bus stop wherever possible.

k. Signs

No signs other than transit insignia and required bus schedules and maps may be permitted upon a bus shelter. Permitted signs shall not obstruct view of on-coming buses.

l. Shelter with Bicycle Racks

- 1) Optional roof extension. A roof may be installed which shall extend at least 6.5' from rear or sides of shelter to completely cover parked bicycles. This roof extension shall have adequate support and be sloped so as to provide proper drainage.
- 2) Number of racks. (See Exhibits C, D, and E) (Note: Landscaping, as shown on Exhibit C, is not required.)
  - a) A minimum of six racks on 50 sq. ft. shelter.
  - b) A minimum of twelve racks on 100 sq. ft. shelter.
- 3) Bicycle rack variety. A minimum Class II type is allowed. This class includes devices to lock both frame and wheels. Preferable racks are:
  - Rack III
  - Rally Rack Models RR-200 or RR-300



m. Exceptions

Shelters of other design and construction materials may be built provided the proposed shelter is approved by the Regional Transit District and the Project Planning Commission. Maintenance responsibilities for a non-conforming shelter may be delegated to the developer should the structure require special maintenance procedures.

3. Responsibility

a. Residential

- 1) With established transit routes or potential to re-route present system within a short time period, developer has option to:
  - Dedicate land and provide acceptable shelter.
  - Dedicate land and contribute specified cash fund to Regional Transit District to cover shelter cost before final map is recorded.
- 2) When future transit service will be provided within a reasonable time, the developer must:
  - Dedicate or provide irrevocable offer of dedication of land and contribute specified cash to Regional Transit District before final map is recorded. A contract will be drawn between Regional Transit and the developer in which RT will be authorized to construct the shelter within 7 years of the subdivision map recording, or return the monies and appropriate accrued interest.
- 3) Land dedication shall include the land necessary to accommodate the appropriate shelter. An additional land dedication or easement may also be required between subdivision lots where street patterns of the subdivision prohibit easy access to the shelter. This additional land shall be at least 20' wide between subdivision lots which back up to a major street with a bus shelter serving the residences.

b. Commercial/Industrial

- 1) With established transit routes or potential to re-route present system within a short time period, the developer has option to:
  - Dedicate land and provide acceptable shelter if site is an acceptable shelter location.
  - Dedicate land and contribute specified cash fund to Regional Transit before building permit is issued if site is an acceptable shelter location.
  - If development site is large enough to merit a shelter but is not an acceptable location for a shelter, developer must provide cash fund to Regional Transit which will be used to construct the amenity at an acceptable location nearby.\*

- If development is not large enough to merit a shelter alone, but is part of the development area requiring or having the potential to require a shelter, the developer must dedicate land, if at appropriate location, and contribute a cash amount to partially cover the shelter cost to the Regional Transit District.
- 2) When transit service will be provided within reasonable future time, developer must:
- Dedicate or provide irrevocable offer of dedication of land, if at appropriate location, and contribute either full or partial shelter cost (based on development size) to Regional Transit fund. A contract will be drawn between Regional Transit and the developer in which RT will be authorized to construct the shelter within 7 years of the issuance of the building permit or return the monies and appropriate accrued interest.

#### c. Land Dedication for Shelters

The land dedication may take one of these three forms:

- 1) Dedication to Regional Transit.
- 2) Dedication to Sacramento County as part of the right-of-way, if a hold harmless agreement by Regional Transit frees the County from liability for accidents which may occur on the property.
- 3) Provision for an easement allowing construction of the amenity and use of the property by Regional Transit personnel and transit patrons.

#### d. Maintenance Responsibility

- The Regional Transit District will be responsible for maintaining the shelter structure unless alternative arrangements have been made between Regional Transit and the developer.

### 4. Application

These standards shall apply to all new developments. Existing developments meeting the criteria for a shelter and requesting a use permit, rezone or other entitlement must comply with these standards in accordance with the provisions of Title I, Chapter 20 of the Zoning Code (Nonconforming Uses).

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\* Regional Transit is undertaking a transit financing study which is expected to investigate and develop means of financing and allocating responsibility for transit improvement provisions. The recommendations resulting from the Regional Transit study may necessitate altering these recommendations.

EXHIBIT "A"  
TYPICAL BUS SHELTER (5'x10')

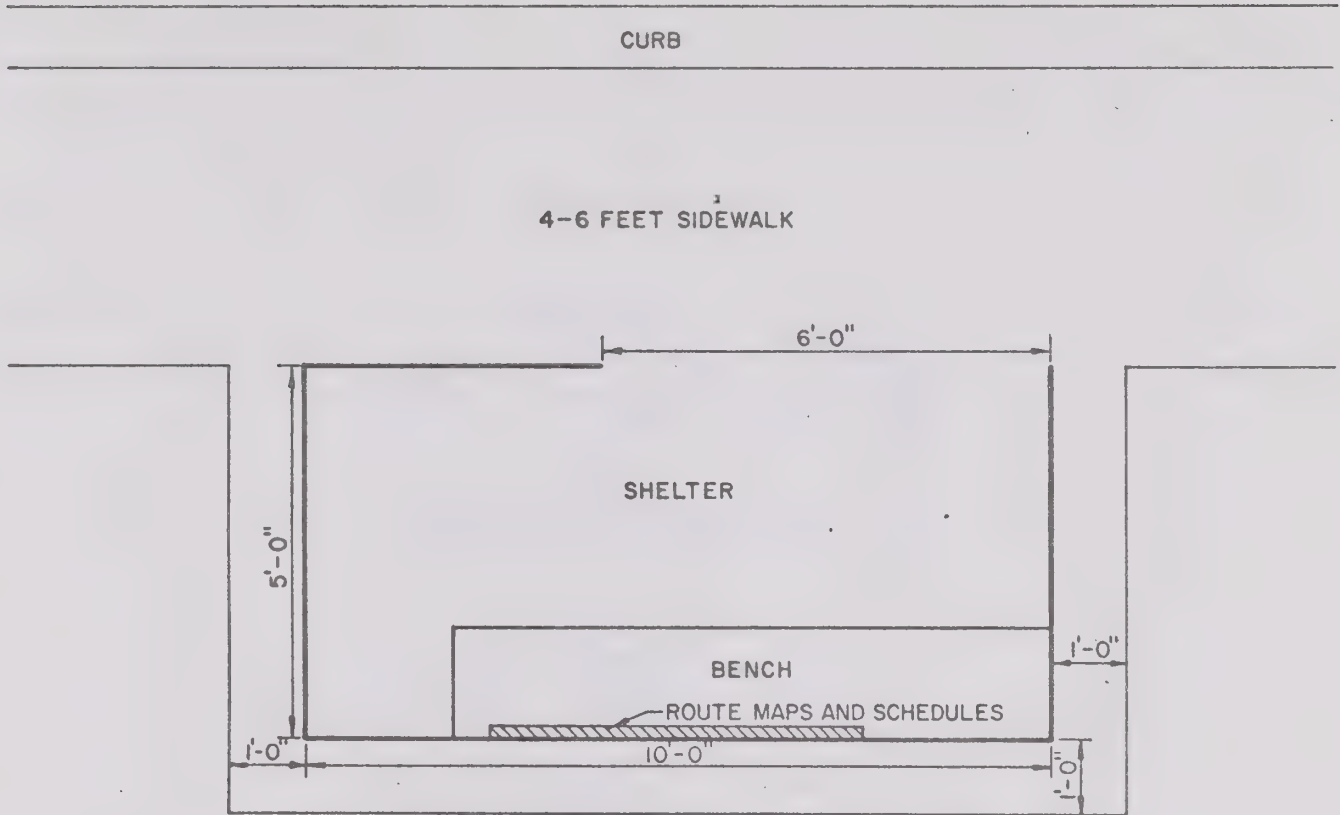


EXHIBIT "B"  
BUS SHELTER (5'x20')

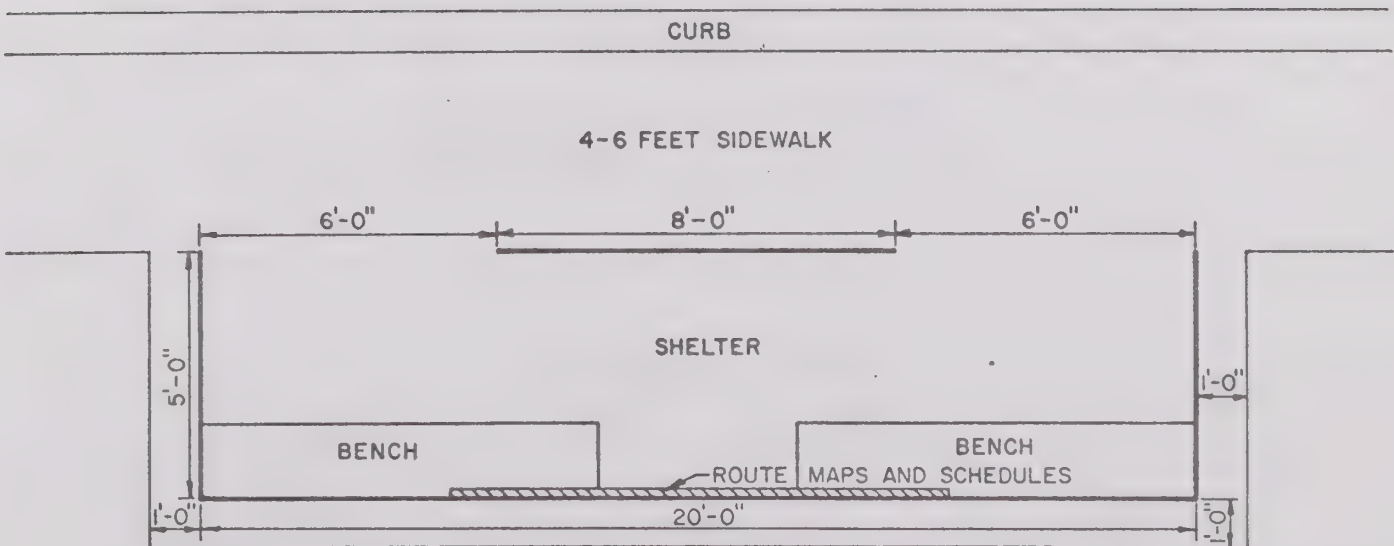




EXHIBIT "C"  
TYPICAL BUS SHELTER SIZE (5'x10')  
WITH BICYCLE AMENITIES

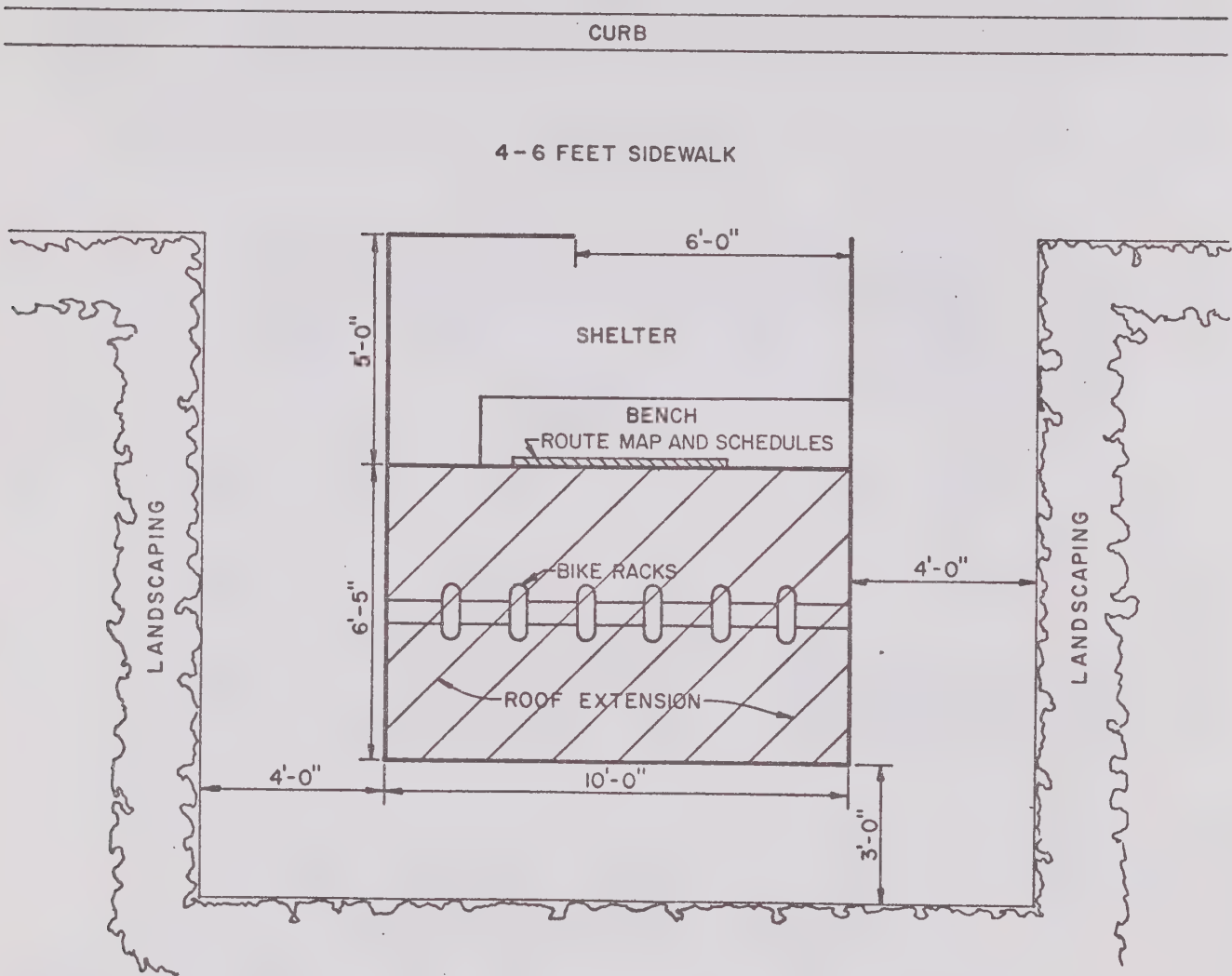


EXHIBIT "D"  
BUS SHELTER (5'x10')  
WITH BICYCLE AMENITIES

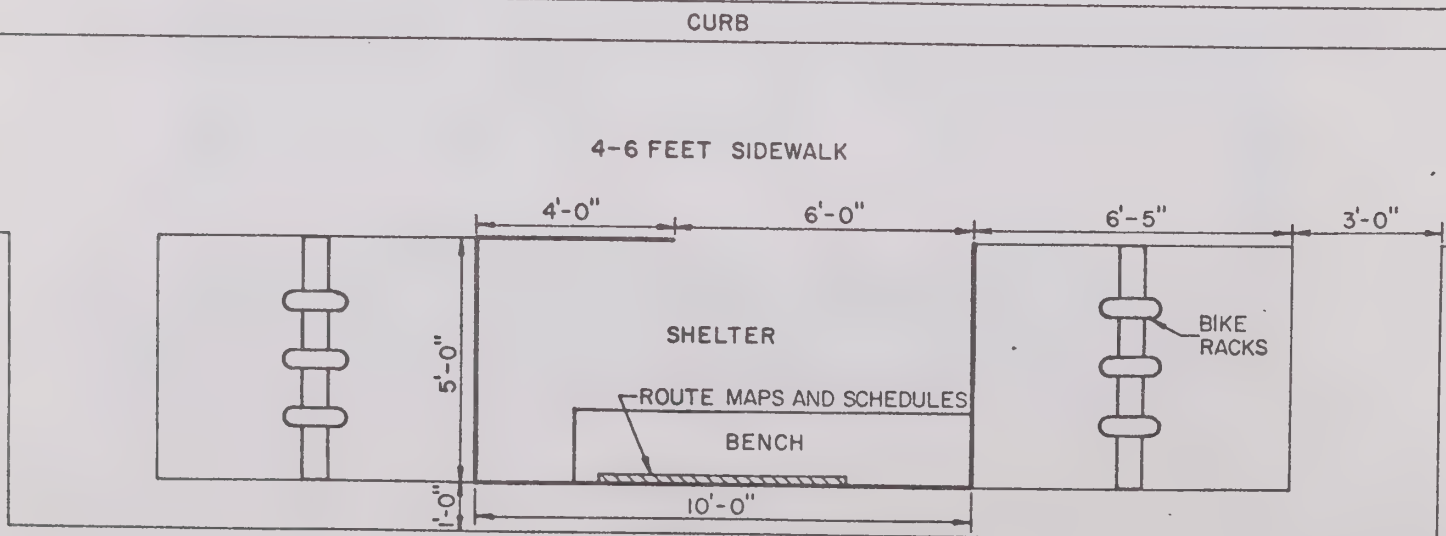
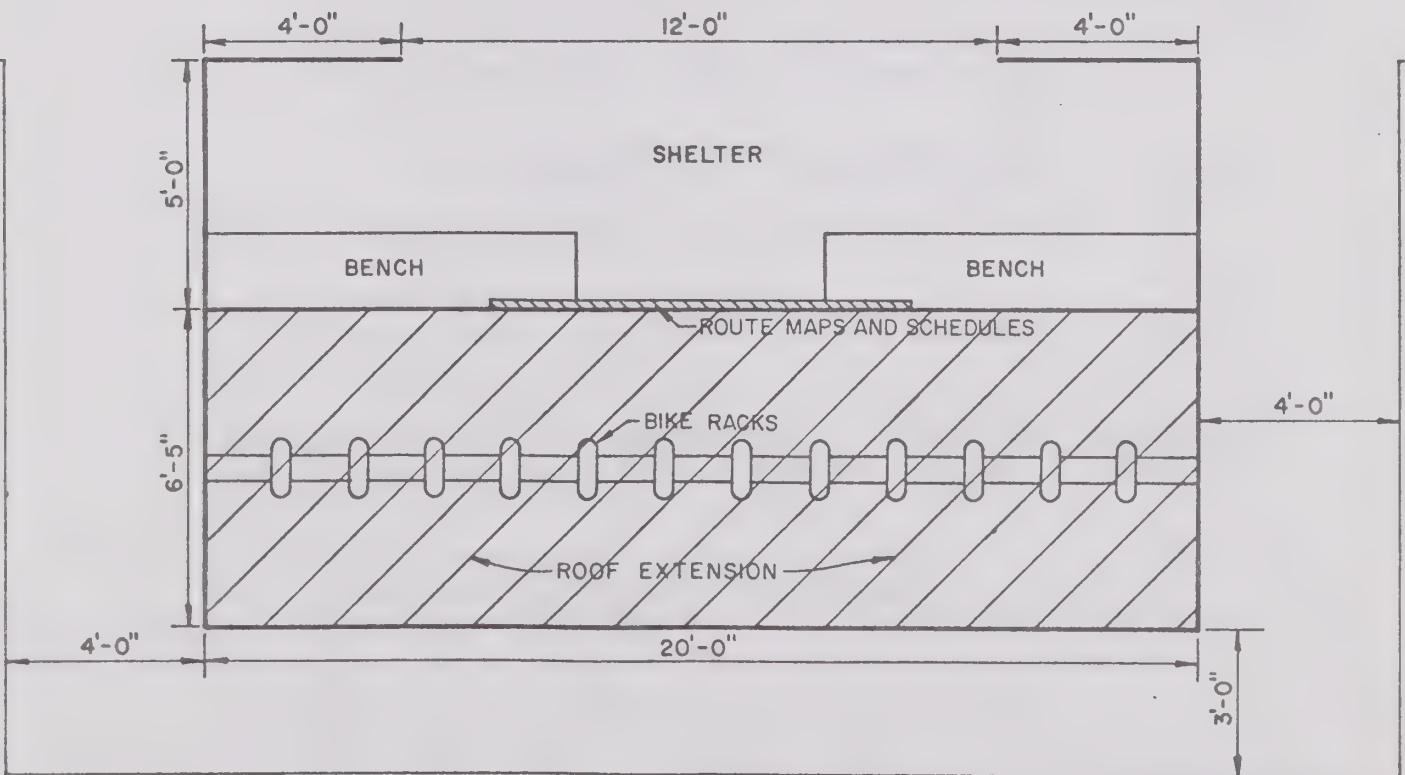


EXHIBIT "E"  
BUS SHELTER (5' x 20')  
WITH BICYCLE AMENITIES

CURB

4-6 FEET SIDEWALK



## B. BUS TURNOUTS

### Present Standards

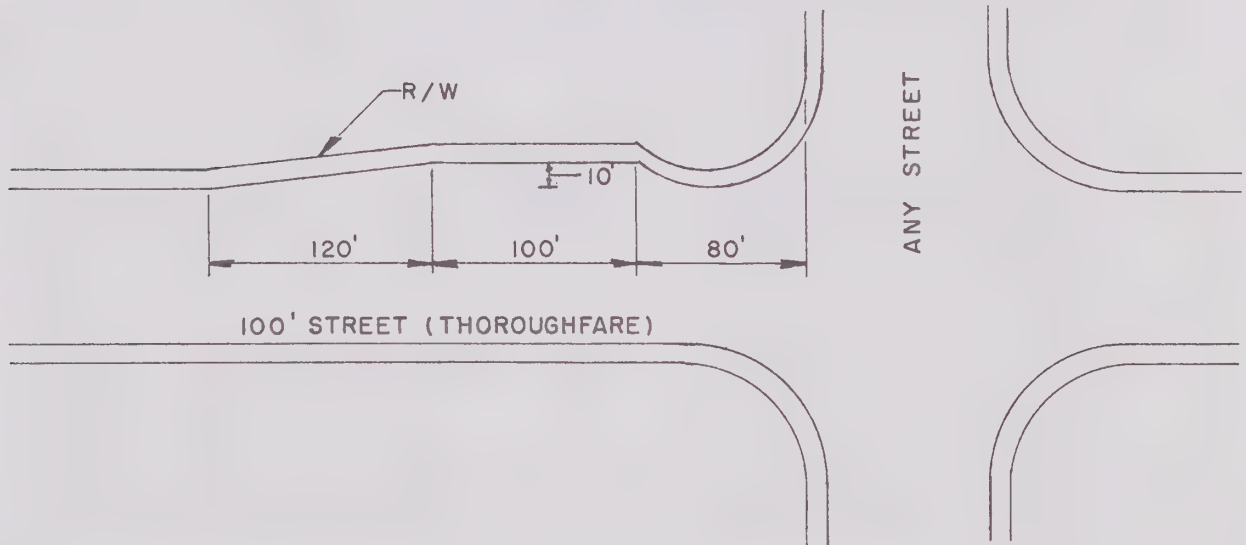
#### 1. Location

Required at far side of the intersection of 84' - 84', 84' - 100', and 100' - 100' streets (arterial and thoroughfare streets). Also required at other locations as determined by the Director of Public Works. (Section 4-13, County Improvement Standards.)

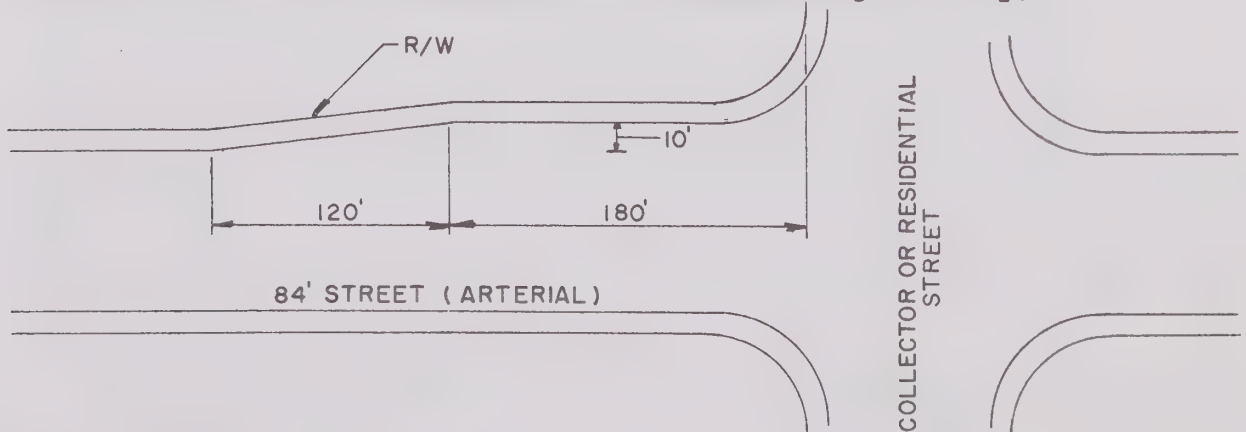
#### 2. Dimensions

300 feet long, 10 feet wide, according to drawings. (Drawings H-24, H-25, County Improvement Standards.)

Drawing A Bus turnout on 100' street intersections.



Drawing B Bus turnout at the intersection of 84' streets and collector or residential streets (66' or smaller right-of-way).



NOTE: Bus turnouts at the intersection of 84' and 84'/100' streets are provided by standard intersection widening with dimensions equal to Drawing B.



### 3. Responsibility

- a. Developer is responsible for 18 feet of structural section and pavement as measured from the lip of the curb and gutter. (i.e., developer is only responsible for land dedication where turnout is required - not the additional length and width of pavement section.) The Director of Public Works has the option of requiring additional pavement responsibility from the developer. (Section 4-17, County Improvement Standards.)
- b. On residential developments that back up to major streets, developer is not required to construct any pavement or structural section other than what it takes to install the curb and gutter adjacent to the backup lots. (Section 4-17, Improvement Standards.)

### Recommendations

#### 1. Location

- a. Require turnouts at the far side of the intersection of major (84' - 100') streets and collector (60' - 56') streets where the development meets any of the criteria listed below. Require at mid-street sections on major (84'-100') streets where the development also meets any of these criteria.

#### LOCATION CRITERIA FOR BUS TURNOUTS

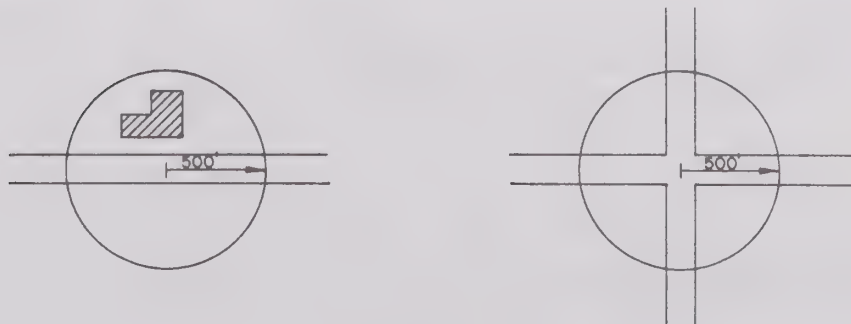
If passenger boarding data is available

- Boarders per day at bus stop 40+  
near elderly residential or activity centers

- Boarders per day at bus stop 50+

Number of parking spaces required according to  
County Standards

- Single development or development area 250+  
within 500' radius of street inter-  
section or development



Number of employees

- Single development or development area within 500' radius of street intersection or development area (See above diagram)

250+

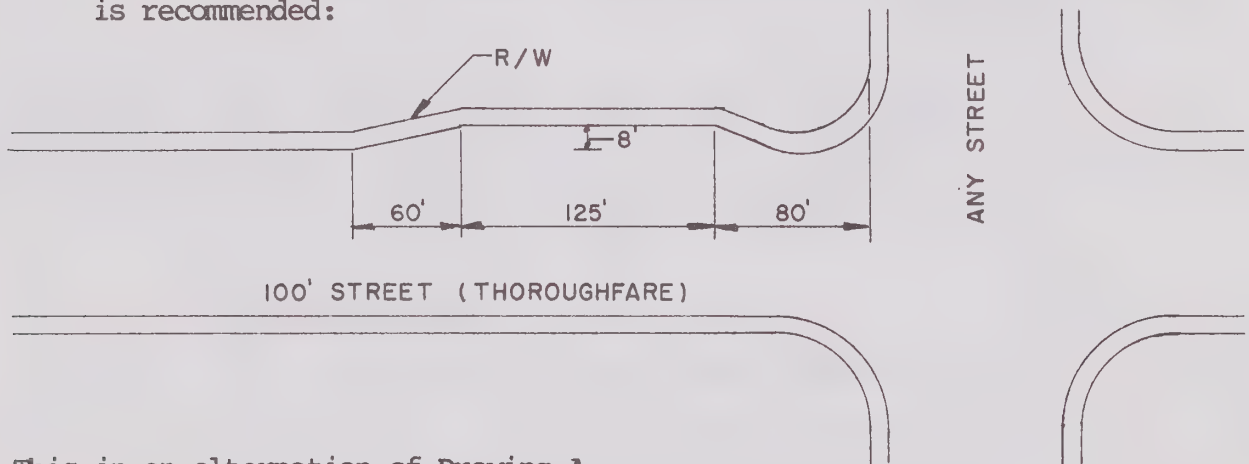
Number of residential units potentially utilizing bus stop

200+

- b. The preferable location for a bus turnout is at the far side of an intersection. Midstreet locations shall be used only where an intersection location is not within a reasonable distance from the development site.

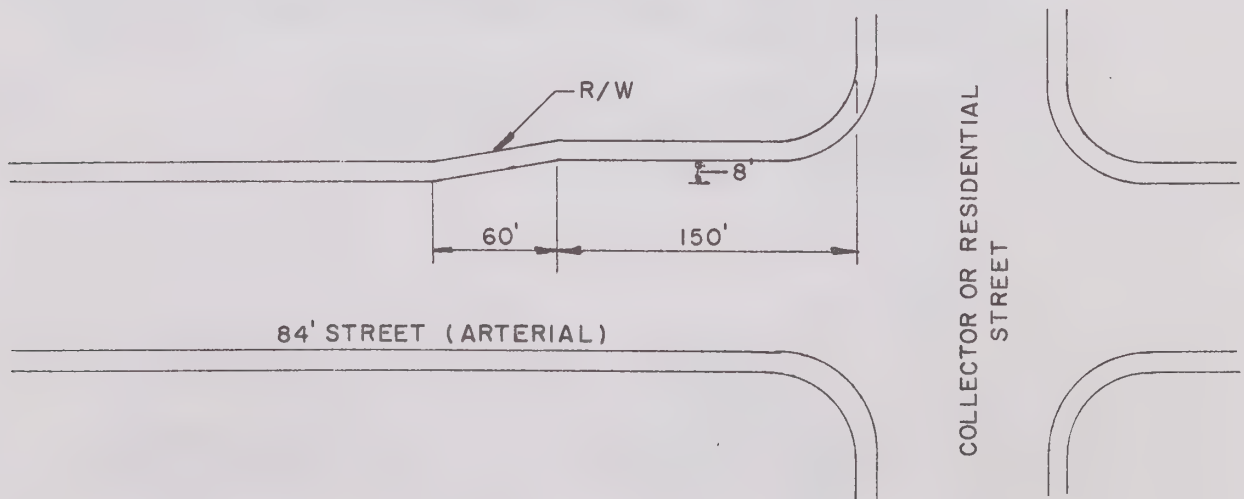
## 2. Dimensions

- a. For turnouts on 100' street intersections, the following alteration is recommended:



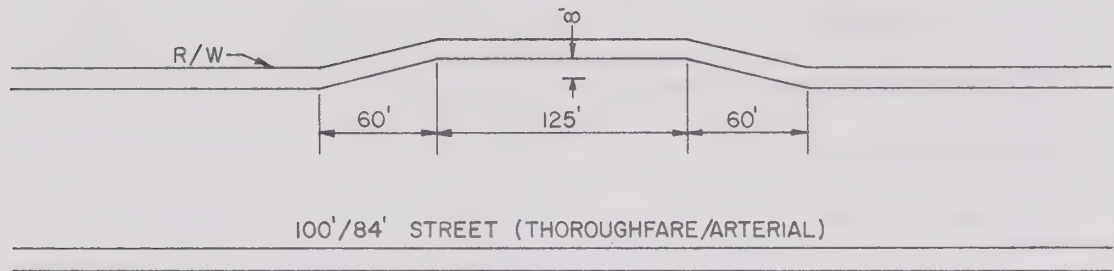
NOTE: This is an alternation of Drawing A.

- b. For turnouts at the intersection of 84' streets and collector or residential streets (66' or smaller right-of-way).



NOTE: The present standard (Drawing B) shall be used at the intersection of 84' - 84' and 84' - 100' streets.

c. Midstreet turnouts on major streets (84' - 100'):



NOTE: The dimensions for a., b., and c. are designed to accommodate two 60' buses.

d. Dimensions for special cases requiring a nearside turnout will be determined by Public Works.

3. Composition

- a. The minimum allowable composition of the roadbed section of the turnout shall not be less than the street of which it is a part.
- b. The sidewalk section along the non-angled portion of the 8' wide turnout shall be widened by 2' which will increase the required sidewalk width to a minimum of 8' in commercial and 6' in residential areas. This additional sidewalk shall be the developer's responsibility.
- c. The minimum allowable structural gutter and curbing section of the turnout shall be of a design and composition approved by the Public Works Department.

4. Responsibility

- a. The developer shall be responsible for the structural section and pavement of the bus turnout in addition to the 18-foot structural and pavement responsibilities as outlined in Section 4-17 of the County Improvement Standards.
- b. On residential developments which back up to major streets, the developer shall be responsible for the structural section and pavement of the bus turnout in addition to the responsibility of curb, gutter, sidewalk, and drainage as outlined in Section 4-17 of the County Improvement Standards.



## 5. Application

These standards shall apply to all new developments. Existing developments meeting the criteria for a turnout and requesting a use permit, rezone, or other entitlement must comply with these standards in accordance with the provisions of Title I, Chapter 20 of the Zoning Code (Nonconforming Uses).

### C. BUS TURNAROUNDS

Present Standards: None

#### Recommendations

#### 1. Definition

Specified, marked route whereby a bus leaves a street, enters a separate area (usually a parking lot), loads/unloads passengers and re-enters the flow of street traffic.

#### 2. Location

- a. At large regional shopping centers and at other locations as determined by the Director.
- b. Specific route, bus stops and facilities shall be determined in site plan review.

#### 3. Building Specifications

Roadbed composition along bus route shall be of a minimum 6" asphalt concrete, 3" aggregate base thickness.

### D. BUS STOPS

#### Present Standards

#### 1. Location

Bus stops are permitted in front of driveways. The bus may be stopped for a period long enough to load or unload passengers. (County Code Section 10.32.030.)

#### Recommendations

#### 1. Location

- a. Bus stops shall be permitted on the far side of an intersection. Midstreet stops will be permitted if an intersection is located a substantial distance from the desired stop location.

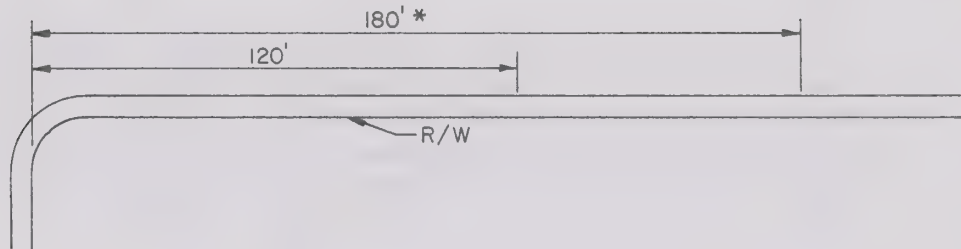
Any nearside stops must receive special approval from Regional Transit and Public Works.

- b. It is preferable to locate bus stops along continuous sidewalks which avoid driveway intersections.

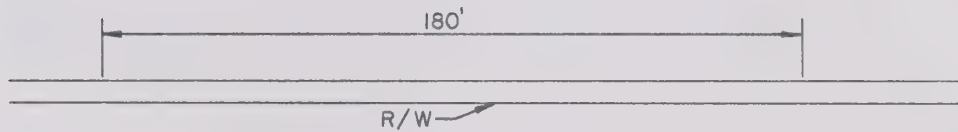
## 2. Construction Specifications

### a. Dimensions

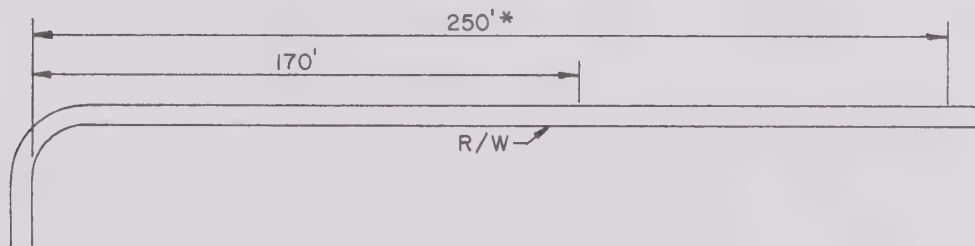
- 1) Far side stop for one bus.



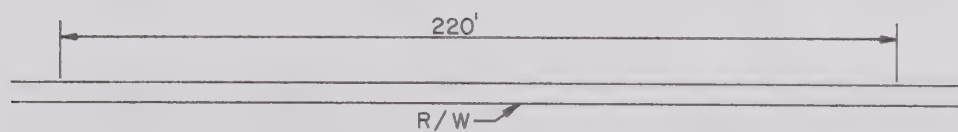
- 2) Midstreet stop for one bus.



- 3) Far side stop for two busses.



- 4) Midstreet stop for two busses.



\* AFTER RIGHT TURN

b. Location

The specific site location for a bus stop shall be determined by Regional Transit. The length of the bus stop shall coincide with property line(s) wherever possible.

c. Bench

Each bus stop shall have a bench at least 6' long constructed of vandal resistant, low maintenance materials. Bench shall be located so that the front and oncoming side will not have visual obstructions for the bus driver or the waiting passengers. Bench shall be placed so as not to obstruct pedestrian traffic along sidewalk.

d. Sidewalk

Widening of the sidewalk may be required along a portion of the bus stop to obtain a minimum 6' wide sidewalk area to load or unload passengers.

e. Parking

Parking along length of bus stop shall be prohibited except in residential areas where such a restraint is undesirable.



## C. OTHER DESIGN ISSUES

A number of additional design considerations deserve mentioning in the context of a parking study, although very few measures would appear to contribute significantly to improved air quality. This section will primarily address design for efficiency of vehicular movement and other appropriate design issues.

1. Drive-Up Windows. The most significant design problem concerns drive-up windows at restaurants and financial institutions. Poorly designed facilities can result in significant congestion within parking lots, at access driveways to parking lots, and even on public streets adjacent to the property. While the effects of drive-up windows on air quality are inconclusive (Sacramento County investigation suggests that the average vehicle using a drive-up window produces more carbon monoxide but less hydrocarbon and oxides of nitrogen emissions), an estimate of fuel consumption indicates that vehicles utilizing drive-up windows consume 4.7 times more fuel than if they were parked.

Field observations tend to indicate that the greatest potential problems with drive-up windows are at banks, possibly because bank patrons have more patience than fast food customers, some bank transactions have the potential for requiring considerable time, peak demand periods at banks are more concentrated within a smaller portion of the week than at fast-food restaurants, or bank customers have less flexibility as to where they do their business than do restaurant customers.

Recommendation: From an air quality-fuel consumption-congestion approach, the ideal solution would be simply to prohibit drive-up windows. A more reasonable approach, though, would be to include more stringent review requirements on applications for use permits for drive-up windows, to assure that those windows that are built are designed so as not to add to congestion on the street or in the parking lot. It is recommended that the Zoning Code be amended to include (1) additional findings to be made by the appropriate authority prior to granting a use permit, and (2) basic requirements to be included as conditions of approval of the use permit.

Add to Title III, Chapter 15, a new "Article 4" entitled "Drive-Up Windows," as follows:

315-50. APPLICATION. the provisions of this Article shall apply to those drive-up windows requiring use permits as defined in Section 225-11, Table II.

315-51. FINDINGS. A use permit for a drive-up window shall not be approved unless the appropriate authority finds that:

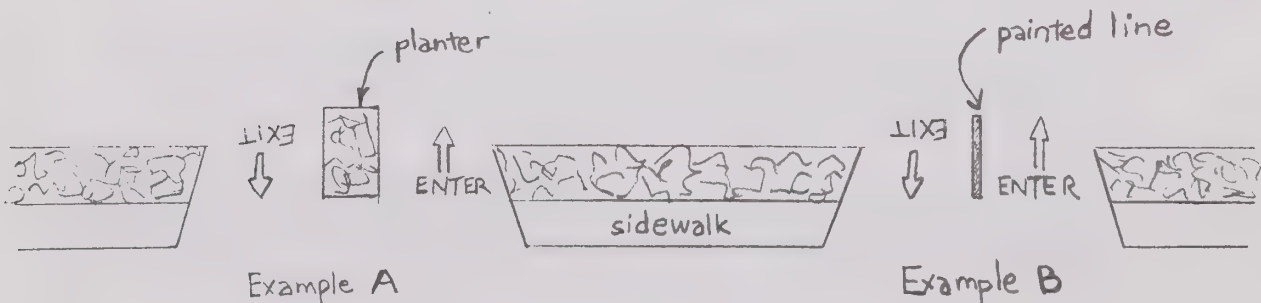
- (a) The design and location of the drive-up window and lane will not contribute to increased congestion on public or private streets adjacent to the subject property.
- (b) The design and location of the drive-up window and lane will not impede access to, or exit from, the parking lot serving the facility, nor impair normal circulation within the parking lot.

315-52. CONDITIONS. In addition to any other conditions which may be imposed lawfully, any use permit issued pursuant to this Article shall include the following conditions, as appropriate:

- (a) Drive-up windows at restaurants shall include an advance ordering station; at least 120 feet of reservoir space shall be provided, and shall be measured from the advance ordering station to the end of the drive-up lane.
- (b) Drive-up windows at financial institutions shall provide at least 180 feet of reservoir space for each drive-up window, as measured from the service window to the end of the drive-up lane.
- (c) No drive-up lane shall extend closer than 25 feet to access driveways.
- (d) The entrance to each drive-up lane shall be clearly marked with a small sign advising customers, "If drive-up lane is full, please proceed to customer parking lot."
- (e) Drive-up windows at financial institutions shall only be used for deposits, withdrawals, check cashing, and loan payments.
- (f) Drive-up windows shall not be considered as justification for reducing the number of parking spaces which are otherwise required.
- (g) The use permit is revocable if congestion attributable to the drive-up window regularly occurs on public streets or within the parking lot, and the management cannot alleviate the situation.

2. Access Driveways. A frequent problem with access driveways occurs when an exiting vehicle is positioned near the center of the driveway, thus blocking entrance to the parking lot; an entering vehicle must stop in the traffic lane and wait for the exiting vehicle to leave before proceeding into the parking lot. Consequently, a potential safety hazard and traffic congestion situation exists.

Recommendation: Add to Section 330-37 of the Zoning Code the following: Where two-way access driveways are used, the design shall include either (a) a planter with lawn or other low ground cover separating the entrance and exit lanes, including small signs denoting "enter only" and "exit only" appropriately placed, when approved by the Public Works Director; or (b) a painted line separating entrance and exit lanes, with stenciled enter/exit markings appropriately painted on the pavement.





3. Recreational Vehicle Spaces. While the parking of recreational vehicles at commercial sites does not appear to be enough of a problem to merit ordinance changes, fire department officials have noted that the parking of recreational vehicles (including trailers, boats, and motorhomes) at condominium, townhouse, and cluster developments often results in parking lot congestion and the blocking of fire lanes. While apartment managers can police the situation in rental projects, there is often no similar authority in condominium/townhouse projects. Our field survey of such projects indicates a maximum potential of 1 RV per 30 units.

Recommendation: Amend the condominium and townhouse provisions of the Zoning Code to require either (a) that recreational vehicle parking areas be provided within the project at a ratio of at least 15 square feet per unit (or 450 square feet per 30 units), or (b) that the CC&R's for the project include an enforceable prohibition against parking recreational vehicles (including trailers, boats, and motorhomes) within the project.

4. Speed Bumps. The use of speed bumps to control excessive speed within parking lots certainly has merit where speed is a problem. Speed bumps, though, present an immediate hazard to bicycles, and are potentially hazardous to motorcycles and emergency vehicles. Considering the potential hazards created by speed bumps, their installation is only warranted where excessive speed is a problem, a situation which does not exist in all parking lots.

Recommendation: Do not establish a requirement for speed bumps; continue as at the present, allowing their installation at the discretion of the property owner when excessive speed is a problem.

5. Bumper Overhang. Present development standards require that a wheel stop be located two feet from the end of the paved parking space to prevent the vehicle from overhanging sidewalks or planters; the result is asphalt where asphalt is not really needed (between the wheel stop and the planter).

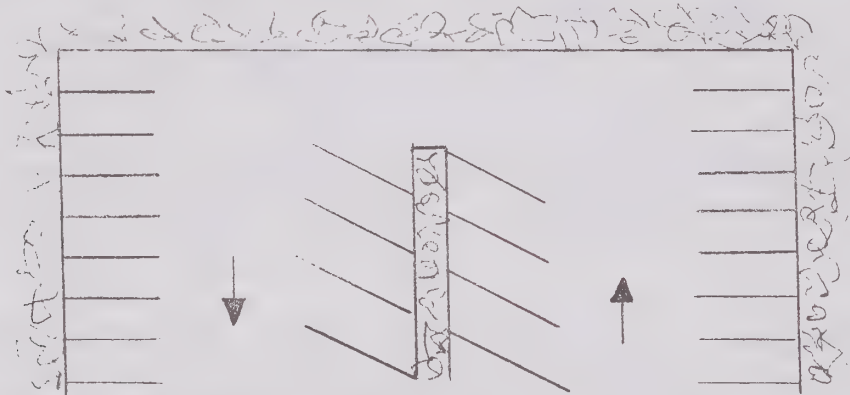
Recommendation: Permit the innermost 2 feet of each parking space to be unpaved, planted with low ground cover, and added to any required or proposed landscaping, to allow for bumper overhang. This additional planting area would be considered as part of the parking space, and would not count toward satisfying the landscaping requirement. This provision would save 180 square feet of paving for every 10 parking spaces, would result in a corresponding reduction in surface runoff, and contribute to the aesthetic environment.

6. Parking Lot Layout. While a 90° parking layout is more efficient than any other design (yield: approximately 6 to 15 more parking spaces per acre than other typical angle-parking layouts), and provides two-way aisles for more direct vehicular ingress and egress, it requires a more difficult turning maneuver than 45° or 60° parking. It appears that the flexibility of various layouts should be retained in order to enable efficient site utilization.



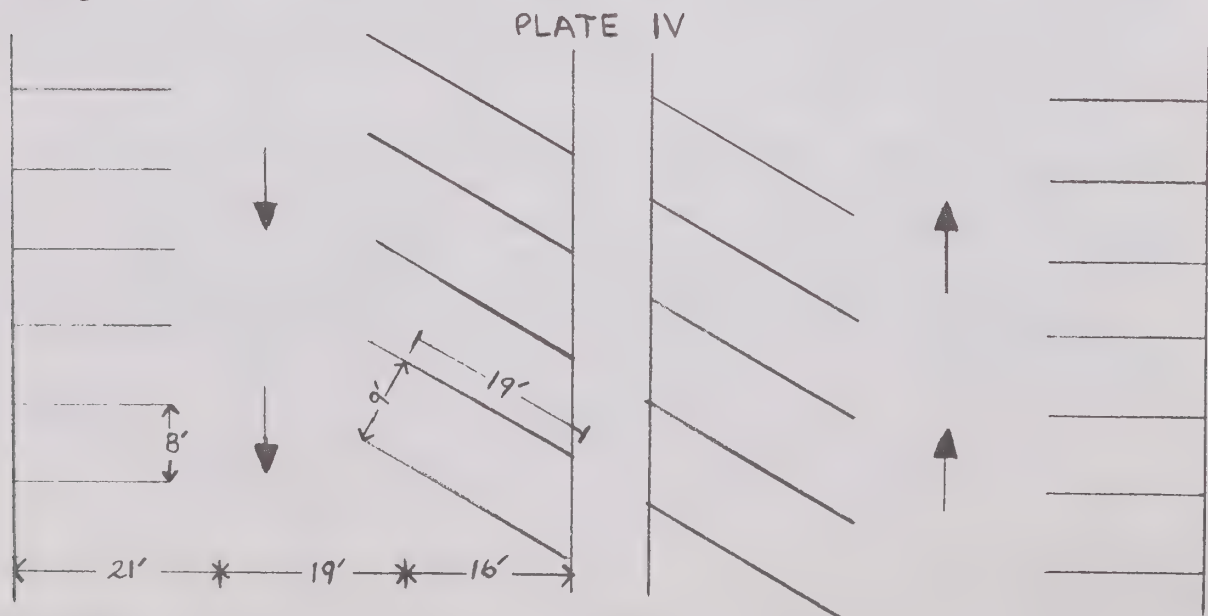
One problem noted in some parking layouts is the use of dead-end parking aisles. A vehicle entering a dead-end parking aisle and finding no vacant parking spaces must back out of the aisle, a maneuver which is particularly hazardous at night or during inclement weather. Our initial inclination was to recommend that dead-end aisles not be allowed. A review of commercial sites, however, indicates that numerous sites could not be reasonably developed without using at least one dead-end aisle. While dead-end aisles should be discouraged, design flexibility necessitates that the option to use them be retained. Wherever they are used, though, 90° angle parking is a must.

Consideration should be given to utilizing the "Drachman System" of parking (successfully tested at the Grossmont Regional Shopping Center in La Mesa, California) for efficiently designing compact and standard spaces into the same one-way aisle. The Drachman System incorporates 90° compact car spaces into the same aisle as 45° or 60° standard car spaces, as illustrated in the sketch below.



The system is self-policing to the extent that small cars can turn easily into the 90° spaces, but large cars cannot, so must use the 45° or 60° spaces.

Recommendation: (a) Add a section to Chapter 30, Article 3 of Title III of the Zoning Code, as follows: "Dead-End Aisles. Dead-end parking aisles are discouraged; when used, ninety (90) degree angle stalls are required," and (b) add to Chapter 30, Article 4 of Title III, a fourth diagram (Plate IV), illustrating the Drachman system as an option (not mandatory) for incorporating compact car spaces into the parking lot design.



7. Small Car Mix. The Sacramento County Zoning Code presently allows 10% of the required parking spaces at any development to be striped for "compact cars." A parking space for a standard car must measure at least 9' x 19'; a "compact" space must measure at least 7' x 14'. For some time now, there has been general agreement that the increasing numbers of smaller cars would justify amendments to the zoning ordinance permitting a greater percentage of the required spaces to be of "small car" size.

Field surveys of numerous parking lots, including the counting of compact cars, were conducted in 1975, and again in August 1979. Compact cars, as expected, showed a marked increase in parking lots surveyed over the last 4 years. In 1979, approximately 42% of the vehicles observed in parking spaces were compacts, compared to 25% in 1975. Table IV-2 illustrates, by land use category, the percent of parked cars which were observed to be compacts. Figure 1 illustrates the frequency distribution (compacts as percentage of all occupied spaces) of 143 parking lot observations. Figure 2 illustrates the 1979 data presented in Table IV-2--compacts as a percent of all occupied spaces, by land use category. For purposes of this study, "compact cars" were defined as those models listed in Class 8 or below (smaller than 9 square meters of floor area covered), as classified by Richard F. Roti & Associates for the National Parking Association.

TABLE IV-2

SMALL CAR MIX, 1975 AND 1979

	% 1975	% 1979	% Differences
Compacts as % of all parked cars: overall	25	42	+17
Compacts as % of all parked cars: by land use category			
Apartments	35.5	48	+12.5
Regional shopping centers	14.5	43	+28.5
Community shopping centers	30.4	36	+ 5.6
Neighborhood shopping centers	17.3	37	+19.7
Restaurant	15.3	40	+24.7
General retail		46	
Professional offices		33	
Convenience markets		47	
Hospitals & medical buildings	35.1	46	+10.9
Banks & savings institutions		45	
Convalescent hospitals		35	

Conclusions: The number of compact cars observed in parking lots in suburban areas of Sacramento County is typically well in excess of 30% of all parked cars.

Two problems associated with designated compact spaces are: (1) large cars attempt to park in compact spaces, thus taking up two spaces; (2) compact cars park in standard spaces even when vacant compact spaces are in abundance, thus reducing the number of standard spaces available to the larger cars. The second problem appears to be the most significant; consequently, it would be unreasonable to permit the same number of compact spaces as there are compact cars because it would be impossible to prevent a small car from using an available large space.

The cars counted as "compact" in our field survey, however, would not all fit into 7' x 14' spaces (really suitable only for "sub-compact" or "sports" cars). While we were not able to break our data into "compact" and "sub-compact" categories, it was apparent that a significant proportion of compact cars would require 8' x 16' spaces.

Recommendation: Amend the Sacramento County Zoning Code to permit up to 30% of the required parking spaces to be for compact cars; increase the minimum size of compact car parking spaces to 8' x 16'. All spaces for compact cars shall be clearly marked, "COMPACT CARS ONLY." Where a parking lot is designed such that an entire section is restricted to compact car parking with an angle of 90°, the aisle width may be reduced from the standard 25' to 23'.

Cost Comparison: A 100-space parking lot (90° parking) designed with 30% compact spaces (8' x 16') in a separate section served by a 23' aisle would result in a savings of approximately 1,905 square feet of paving over a 100-space parking lot with all standard spaces (9' x 19') and aisles (25'). At an average development cost (for parking lots larger than 20,000 square feet.) of \$1.45 per square foot, the monetary savings would be \$2,762 per 100 spaces.

A 100-space parking lot with 30% compact spaces dispersed throughout the lot (no aisle width savings) would result in a savings of approximately 1,290 square feet of paving; the monetary savings (at \$1.45 per square foot) would be \$1,870 per 100 spaces.

For very large parking lots, then, the monetary savings could be substantial. Of greater importance, though, is the increased flexibility in parking lot design and the potential increase in floor area and landscaped area which would be available to the landowner.



FIGURE 1  
Compacts as Percent of All Occupied Spaces:  
Frequency Distribution

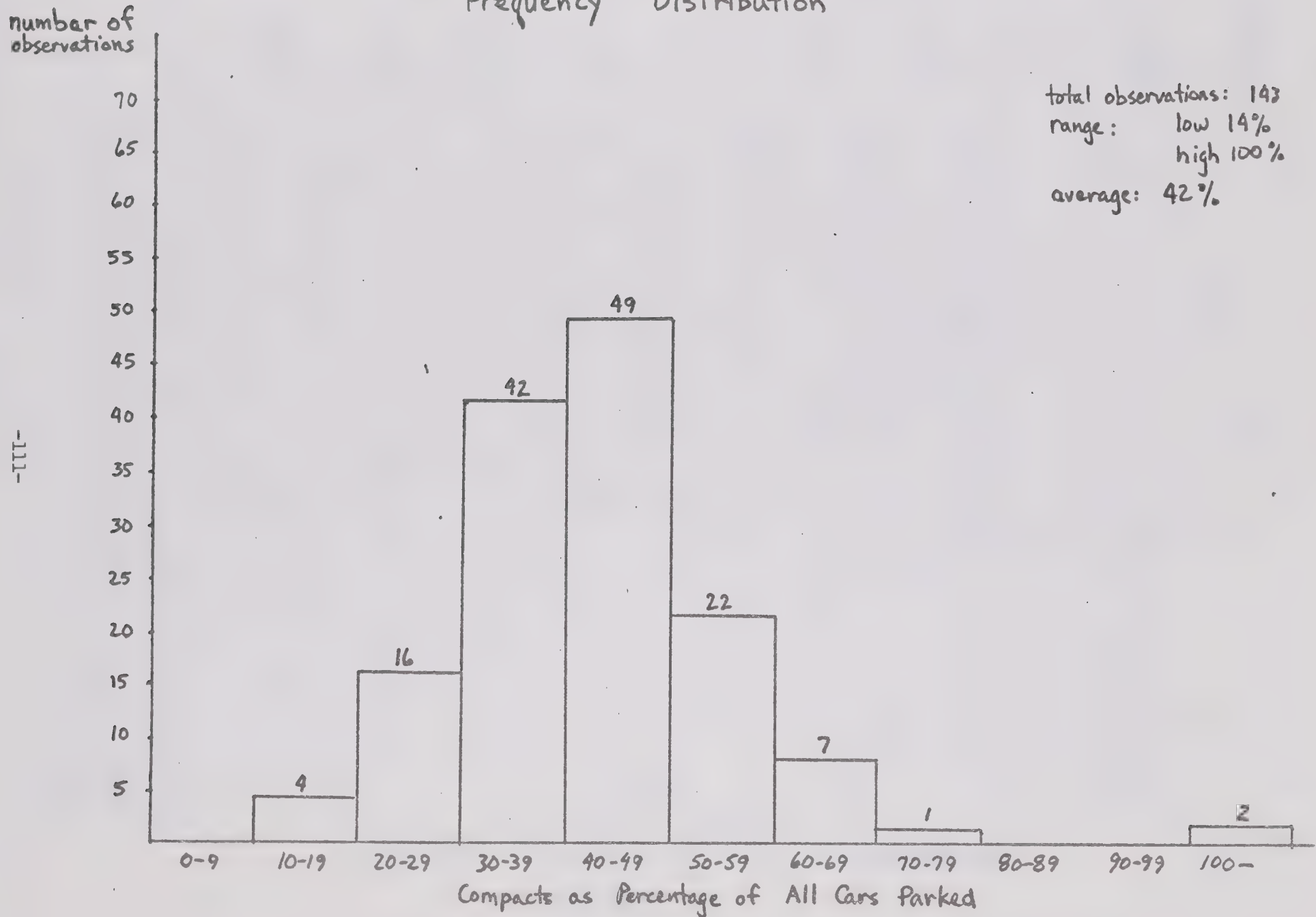
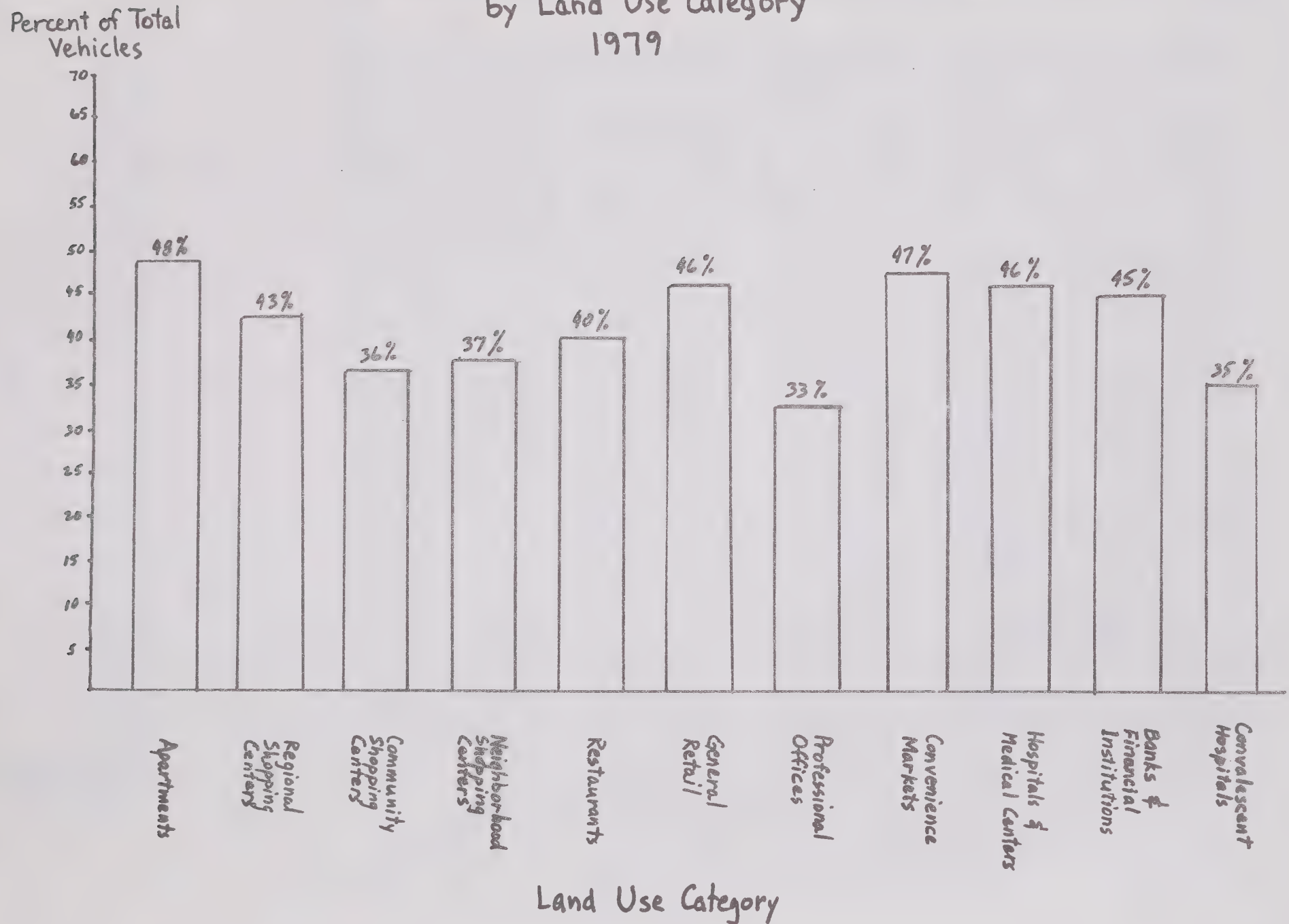


FIGURE 2

Compacts as Percent of All Occupied Spaces  
by Land Use Category  
1979



## CHAPTER V

### PARKING LOT LANDSCAPING

Landscaping has become an integral part of parking lot design over the last ten to fifteen years. Most jurisdictions throughout the state have incorporated landscaping requirements into their zoning codes. Sacramento County adopted landscape ordinances in 1968 which established both interior and peripheral parking lot standards.

This chapter will review present County landscape requirements applicable to parking areas. The extent to which these requirements add to the realization of the potential benefits of good landscape design are evaluated. Based on conclusions drawn from these evaluations, revisions to present landscape ordinances are recommended as necessary.

Aesthetics and screening perhaps provide the most obvious and compelling reasons to require landscaping. Plants and trees offer beneficial contributions to the overall surroundings in many ways. Listed below are several favorable functions accomplished through parking lot landscaping.

#### - Visual Enrichment

- . Reduces monotony by breaking up bleak expanses of pavement.
- . Enhances surrounding architectural structures.
- . Provides diverse texture, color and form.

#### - Community Enhancement

- . Adds character to the area.
- . Provides harmony and a positive feeling to residents and visitors.

#### - Screening

- . Conceals parking area from adjacent streets.
- . Transition and/or partition between connecting land uses such as residential.
- . Provides privacy, especially from multiple story buildings.

#### - Shading

- . Comfort to parking patrons.
- . Interior vehicle temperature can be reduced from 160° to 105° if parked in a shaded area on a typical summer day in the Sacramento region.



- Increased Property Values

- . Provides increased desirability of development to potential lessees.
- . Potential economic gain in rental or resale of property.

- Safety

- . Controls access to parking lot.
- . Emphasizes traffic diverters.
- . Delineates pedestrian walkways.
- . Guides both vehicle and pedestrian traffic circulation.
- . Reduces glare and reflection from direct sunlight and from automobile and structural surfaces.

- Energy Conservation

- . Ambient temperatures can be kept 10°+ F cooler with tree shade, thus lowering air and surface temperatures. The cooling effect on buildings results in a substantial reduction in heat load and reduced energy use for air conditioners.
- . Deflection and filtering of winter winds on structures can reduce the chill factor and reduce potential heat loss by a small amount.
- . Gasoline savings.
  - Given that shade can reduce interior vehicle temperature by 50°-60° on hot summer days, and cars operate with 10% better gas mileage without air conditioning, then drivers of shaded cars will consume slightly less gasoline provided that they turn off their air conditioners as soon as a comfortable temperature is reached.

- Nuisance Minimization

- . Noise abatement.
  - Studies have shown that a dense area of vegetation can reduce the ambient noise level, although the actual reduction attributable to parking lot landscaping is small.
- . Heat reduction inside a shaded car is an advantage in terms of comfort.
- . Wind blockage.
- . Glare reduction.

- Improved Air Quality

- . Ozone removal.
  - 60-90 parts per billion of ozone in a polluted air mass can be removed in one hour over a forest. The implications of this study relative to parking lot landscaping are limited since a great deal of vegetation is needed to have a measurable impact on ozone levels. However, the more vegetation planted, the more ozone removal is able to occur.
- . Particulate removal.
  - Studies indicate that airborne dust particulates on streets with trees are 1000-3000 particles/liter compared to 10,000-12,000 particles/liter on streets without trees in similar areas of a town. Since plant materials entrap airborne dirt, pollen, fly-ash, and smoke in their foliage, landscaping could provide mitigation against high particulate levels in the Sacramento region where particulates are problematic.
  - Guttation process on leaves enables plants to settle out particulates and wind-borne pollutants.
- . Oxygenation and dilution of surrounding air.
- . Odor reduction.
  - Fragrant plant materials can mask gaseous and unpleasant odors.
  - Absorption and metabolization into plant.

Not all consequences attributable to parking area landscaping are advantageous. Listed below are some of the disadvantages which could result from landscaping as well as possible mitigating measures to lessen or eliminate these unfavorable results.

- Increased Costs

- . Total initial project cost.
  - An analysis based on 1980 prices in Sacramento indicates that the increased cost of providing 10% interior landscaping is less than 1% of the total parking lot cost. Of course, the economic benefit from the increase in land area which could be gained if the landscaped area was utilized as parking or building space cannot be measured. (See Appendix "A")
  - A 1976 cost study in Riverside, California estimated a 2% increase in the total project cost when 8% landscaping was provided. A major consideration in comparing this study with the 1980 Sacramento analysis is the differences in the costs of paving. The price of petroleum, which is an integral part of the material, and installation cost of paving has risen substantially within this time frame as has the cost of labor.

- . Maintenance cost.

- The 1976 Riverside study estimated a \$35 monthly cost for a parking area of approximately 15,500 square feet with 8% landscaping.
- \* Mitigating measure: Use plant materials which require minimal pruning, trimming and spraying and have qualities which categorize the specie as "clean" (i.e., no messy fruits, excessive leaf problem, etc.).

- Safety Hazards

- . View obstruction.

- Improperly planted vegetation can block driver's view of other cars or pedestrians.
- \* Mitigating measure: Set height and placement requirements for plant materials at applicable locations.
- Reduces visibility of businesses and advertising for potential patrons.
- \* Mitigating measure: Better planning in terms of plant type and placement.

- . Crime potential.

- Shields criminal activities from passing cars and patrol vehicles.
- \* Mitigating measure: Regulate type and placement of trees to obtain optional mix of screening and visibility.
- Dense landscaping can offer concealment for would-be criminals.
- \* Mitigating measure: Improved lighting.

- Damage to Parked Vehicles

- . Falling limbs, sap, bird droppings, etc.
- \* Mitigating measure: Better plant selection (i.e., trees which are not brittle-limbed, do not exude sap, or attract excessive birds, etc.) and adequate maintenance.

- Appearance

- . Poor maintenance can create an eyesore.
- \* Mitigating measures: (1) Plant selection requiring minimal maintenance, (2) Adequate professional maintenance program, and (3) Information supplied to appropriate person as to proper care and maintenance of selected plants.



- Increased Water Demand

- . Not a significant problem except in drought conditions.

\* Mitigating measure: Use plant materials which are drought resistant.

A majority of the potential disadvantages can be reduced or eliminated through better planning and design. Development and maintenance costs appear to be the major drawbacks to landscaping. However, the numerous and significant advantages of landscaping appear to outweigh any disbenefits and justify the increased costs.

The principal goal of this report is to provide planning policies for the safe, aesthetically pleasing, and functional use of parking lot landscaping in commercial and industrial developments throughout the county.

The objectives of parking lot landscaping are enumerated here.

1. To encourage landscaping design which promotes pedestrian and vehicular safety.
2. To promote landscaping design which is protected from vehicular and pedestrian damage.
3. To discourage the use of high-maintenance, nuisance causing, hazardous plant materials.
4. To require a reasonable mix of plant and tree varieties in the parking area.
5. To assure distribution of landscaping throughout the parking lot.
6. To require partial screening of the parking lot from adjacent streets.
7. To require total screening of a parking area from adjoining residential, interim estate, recreation or agricultural/residential zones.
8. To require a reasonable amount of shade from tree canopies be provided within a parking area.
9. To encourage landscape design which enhances passive solar energy concepts.
10. To assure proper maintenance is provided.
11. To encourage landscaping which will be beneficial to air quality.
12. To encourage landscape requirements which are well-defined and easily applied.

### Major Problems and Deficiencies in the Present County Standards

1. Lack of guidance or specific recommendations for optimal plant and tree varieties and sizes.
2. Lack of a standard to accomplish good shading within a parking lot.
3. No effective means to assure proper maintenance.
4. Ordinances are vague in terms of defining and distinguishing between interior and perimeter landscaping.
5. Requirements are not always equitable between zones.
6. Lack of guidance regarding visibility criterion in design.
7. Lack of guidance regarding solar access considerations.
8. Lack of standard prohibiting overuse of a single plant or tree specie.

## RECOMMENDED ORDINANCE AMENDMENTS

### A. PERIMETER LANDSCAPING

#### Present Code Requirements

##### 1. Adjacent to all street rights-of-way:

- a. Minimum 4 ft. wide planter or landscaped area.
- b. Screening: None.
- c. Trees shall not be planted any closer than 6 ft. from the back of sidewalks adjacent to County streets (Section 4-26 of County Improvement Standards).

NOTE: Public Works expressed extreme reluctance to reduce this. 'Tree Task Force' and other community groups have strongly indicated their desires to encourage street tree plantings which would infringe on the present 6' distance. It has been noted that proper planting (digging past hardpan layer) and control of tree species planted (deep rooted, non-destructive varieties) would eliminate the main problem of sidewalk buckling.

##### 2. Adjoining residential, recreation, interim residential, interim estate, agricultural or interim agricultural zones.

- a. Trees planted 30' on center in individual planters.
- b. Minimum 4 by 4 foot tree planting area.

#### Recommended Changes

##### 1. Adjacent to all street rights-of-way:

- a. Minimum 5 ft. wide planter. Any curbing is in addition to this width.
- b. Landscaping shall consist of shrubs, hedge, or natural growth designed to form a visual screen of minimum 3 ft. height. Said landscaping shall not exceed 2.5 ft. in height at street and driveway intersections to assure adequate visibility in accordance with Section 4-10 of Improvement Standards. In addition, at least 1 tree from the County screen tree list shall be planted every 50 ft. - also in conformance with visibility standards. Trees shall not be planted closer than 3 ft. from the back of the sidewalk.



2. Adjoining residential, interim residential, recreation, interim estate, agricultural-residential, agricultural or interim agricultural zones.
  - a. Trees from the County screen tree list shall be planted at least every 30 ft. on center in combination with other plant materials to provide dense visual screen.
  - b. Planters shall be a minimum 5 ft. wide and 25 sq. ft. in area.

## B. INTERIOR LANDSCAPING

### Present Code Requirements

1. Applicability threshold: more than 10 spaces.
2. Coverage area: 5% of total parking area.
3. Visibility: None.

### Recommended Changes

1. Applicability threshold: 5 spaces or more.
2. Coverage area:

Parking Spaces Required According to Code	% of Total Parking Area
5-24 spaces	5% minimum
25-49 spaces	7.5 % minimum
50+ spaces	10% minimum

In addition to the required perimeter landscaping, there shall be interior landscaping covering a percentage of the total parking area in accordance with table. Landscaping must conform to the definition of "interior landscaping" to count toward the requirement.

3. Visibility: Landscaping at end of aisles shall not obstruct driver's vision of vehicle and pedestrian cross-traffic. Mature trees shall have a 6' foilage clearance and other plant materials must be 2'6" or less in height.

## C. GENERAL LANDSCAPE STANDARDS

### Present Code Requirements

1. Shading: None.
2. Tree size: None.
3. Acceptable plant materials: None.

4. Distribution: None.
5. Percentage of species allowed: None.
6. Planting beds: None.
7. Solar access: None.
8. Impermeable surfaces: Not more than 30% of landscaped area may be covered with hard, impervious material (pedestrian walks, gravel, rock, etc.).
9. Retention of existing trees: None.
10. Maintenance: Within the landscaped area, an irrigation system and live landscaping shall be provided and maintained.
11. Enforcement: None.
12. Landscaping planters required along perimeter must be sufficiently large and protected so a parked vehicle does not intrude or overhang the tree planting area.

#### Recommended Changes

1. Shading: A percentage of the paved parking area shall be shaded by tree canopies within 15 years of building permit issuance in accordance with this table:

5-24 parking spaces:	30% shading
25-49 parking spaces:	40% shading
50+ parking spaces:	50% shading

Plantings shall consist of trees from the "shade tree" list. Shade coverage area shall be determined by the circular area of the tree canopy diameter as given in tree list. Any tree contributing full or partial shade to the parking lot (whether located on the property or not) shall be counted as part of the requirement. Only that portion of the tree which shades the lot shall be counted toward the requirement. Only trees (not buildings, hedges, etc.) may be used in determining shade.

2. Trees shall be a minimum 15-gallon size at planting.
3. Acceptable plant materials: Landscaping shall consist of trees listed in the landscaping tree list. Trees planted for shade or screening shall be varieties listed under the respective category. Any alternative species may be planted upon approval of Planning Director. Shrubs, vines and groundcover species listed are not all inclusive. Landscaping list shall be reviewed every 5 years to make any desirable or necessary changes for the public interest.

4. Distribution: Landscaping shall be located throughout the parking areas so as to obtain the maximum amount of dispersion.
5. A single plant or tree species may not comprise more than 50% of the planting in the respective category listing.
6. All landscaping shall be provided in planters bounded by a containing curb having a minimum 6" height. The minimum planter size shall be 25 square feet.
7. Solar access: Any planting materials shall not obstruct solar access of development on adjacent properties.
8. Impermeable surfaces: Not more than 25% of landscaped area.
9. Existing mature trees on development site shall be retained where possible.
10. Maintenance: All plant materials shall be maintained free from physical damage or injury arising from lack of water, chemical damage, insects, diseases, blight or other causes. Plant materials showing such damage shall be replaced by the same or similar vegetation which will exhibit comparable growth. Proper trimming, pruning and staking procedures shall be followed. Planting areas shall be kept free of weeds, debris, and undesirable materials which may be detrimental to safety, drainage or appearance, including fallen leaves and fruits.
11. Enforcement: Whenever a person fails to comply with any part of the landscape requirement, the Director of Public Works may require, upon thirty day's written notice, such compliance. If non-compliance continues thereafter, the Director may cause work to be done and plantings to be made to bring the landscaping or area into compliance at the property owner's expense.
12. All landscape areas shall be designed so that any plant materials are protected from vehicle damage or encroachment.

#### DEFINITIONS

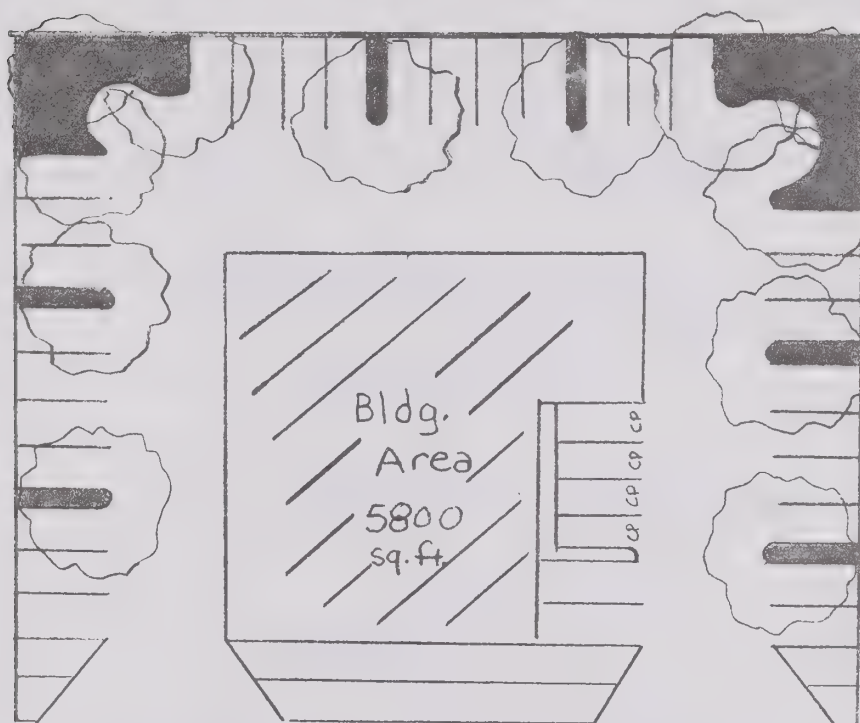
Plant materials: May include trees, shrubs, hedges, vines, groundcovers and lawns.

Interior landscaping: Any landscaping within the paved area utilized for the parking and maneuvering of vehicles including: stalls, aisles, access drives and unusable (dead) spaces. Interior landscaping shall not include any required landscaping which abuts or adjoins the perimeter of the paved area.



# APPENDIX V-1

## PARKING LOT LANDSCAPING: COST ESTIMATES



### Areas

Gross parking	15,825 sq. ft.	
Net parking	14,245 sq. ft.	
Landscaping	1,580 sq. ft.	(10% of interior)
Shading	8,046 sq. ft.	(51% of lot)

Scale 1" = 40'

36 parking spaces  
(6.2 spaces/1000 sq. ft.)

### Landscaped Parking Lot

#### Estimated Landscaping Costs (installed)

Curbing 405' @ \$4.65 per ft.	\$ 1,884
Irrigation lines 325 @ \$1.70 per ft.	552
Hose bibs 8 @ \$16.10 each	129
15 gallon trees 12 @ \$72 each	864
Groundcover 13 flats @ \$22.50 per flat	293

Total Landscaping Cost (\$2.36 per sq. ft.) \$ 3,722

Estimated Costs for A.C. paving, base material,  
wheel stops and striping  
14,245 sq. ft. @ \$2.20 per sq. ft. \$31,339

Estimated Land Cost  
15,825 sq. ft. @ \$1.75 per sq. ft. \$27,694

TOTAL PROJECT COST \$62,755

Totally Paved Parking Lot (no landscaping)

Estimated costs for A.C. paving, base material,  
wheel stops and striping

15,825 sq. ft. @ \$2.20 per sq. ft. \$34,815

Estimated land cost

15,825 sq. ft. @ \$1.75 per sq. ft. \$27,694

TOTAL PROJECT COST \$62,509

Additional cost of landscaped parking lot over  
unlandscaped (\$62,755-\$62,509)

\$ 246

New cost per sq. ft. of landscaped area  
(\$246/1580 sq. ft.)

\$ .16

Increase in total project cost to provide  
landscaping (\$246/\$62,509)

.40%

Estimated monthly maintenance cost

\$ 40/month

NOTE: Water meter and/or hook-up charges  
were not considered in costs.

NOTE: If landscape costs increased to \$2.50/sq. ft.,  
the additional cost of landscaping a parking  
lot over an unlandscaped lot would be: \$474.  
The percentage increase in the total project  
cost would be .76%.

## APPENDIX V-2

### PLANT MATERIALS FOR PARKING LOT LANDSCAPING

The following list of plant materials for parking lot landscaping was compiled to aid in specie selection. The 'screen' and 'shade' tree lists are complete lists of the acceptable trees which can be planted. Any additions must receive approval from the planning department. The shrubs and groundcover varieties listed are recommendations; any additional species may be planted without approval.

Selection of the plant materials listed was based on the following characteristics:

1. Deep-rooted - won't cause pavement buckling.
2. Insect and disease resistant.
3. Adaptable to urban environment - heat and pollution tolerant, drought and wind resistant.
4. Relatively long-lived.
5. Relatively little maintenance required.
6. Suitable for paved parking areas - no messy fruits, dripping sap, pungent odors, etc.

A preliminary list of plant materials was prepared by the planning staff and sent to various agencies, nurseries and individuals for further screening and recommendations. The data was compiled and a finalized list was prepared based on the tabulated survey results. Contributors included landscape architects and plant experts from the Sacramento County Parks and Recreation Department, Sacramento City Parks Department, Tree Task Force, Matsuda's Nursery, Fountain Square Nursery, and various individuals.

The species listed are not foolproof for all situations. Consultation with a nurseryman or landscape architect is desirable before any selections are made. Professional guidance is recommended to assure that the optimal design is achieved to meet the needs of each development. Proper planting procedures, optimal spacing distance, soil and water requirements and maintenance programs should be ascertained at the outset of the landscape project. It is important to note that proper planting procedures may include digging past the hardpan layer to assure deep-rooting and proper growth.

All trees planted should be tagged with identifying botanical names at the time of the building inspection to assure conformation to code.



## SHADE TREES

Botanical Name	Approximate 15 Year Crown Diameter	Full Shade Area (sq. ft.)	1/2 Shade Area (sq. ft.)	Comments	Restrictions
Ginkgo biloba Maidenhair tree	35'	962	481	Deciduous. Use 'Autumn Gold' or 'Fairmount' varieties. Plant in deep soil and stake young trees. Good fall color. Excellent selection.	Male trees only.
Pistacia chinensis Chinese pistache	25'	491	246	Deciduous. Stake young trees and prune to develop head high enough to walk under. Excellent fall color. Very good selection. Male trees best.	
Celtis sinensis Chinese hackberry	30'	707	354	Deciduous. Good in windy locations but stake young trees well. Very good choice.	
Cinnamomum camphora Camphor tree	25'	491	246	Evergreen. Wide trunk base. Very good choice.	Use in large planters.
Pyrus calleryana Ornamental pear	25'	491	246	Deciduous. Watch for fireblight. Use 'Bradford' variety.	
Quercus agrifolia Coast live oak	30'	707	354	Evergreen. Don't plant too close together.	Large parking lots only (50+ spaces).
Quercus lobata Valley oak	30'	707	354	Deciduous. Don't plant too close together. Good choice.	Large parking lots only (50+ spaces).

SHADE TREES (Cont.)

Botanical Name Common Name	Approximate 15 Year Crown Diameter	Full Shade Area (sq. ft.)	1/2 Shade Area (sq. ft.)	Comments	Restrictions
Quercus ilex Holly oak	25'	491	246	Evergreen.	
Quercus rubra Red oak	30'	707	354	Deciduous. Do not plant too close together. Stake young trees.	Large parking lots only (50+ spaces).
Quercus suber Cork oak	25'	491	246	Evergreen.	
Tilia cordata Little-leaf linden	20'	314	157	Deciduous. Stake and shape young trees. Does attract bees in summer. 'Greenspire' and 'Rancho' varieties are good. Good choice.	
Celtis australis European hackberry	30'	707	354	Deciduous. Good in windy location, but stake well.	
Tilia americana American linden	20'	314	157	Deciduous. Stake and shape young trees.	
Sapium sebiferum Chinese tallow tree	30'	707	354	Deciduous. Excellent fall color. Stake young plants securely. Prune to single trunk. Good choice.	

SHADE TREES (Cont.)

Botanical Name Common Name	Approximate 15 Year Crown Diameter	Full Shade Area (sq. ft.)	1/2 Shade Area (sq. ft.)	Comments	Restrictions
Liriodendron tulipifera Tulip tree	25'	491	246	Deciduous. Plant in deep soil in location where constant wind from one direction won't strike tree. Spreading roots. Good choice	Use in large planters only.
Carpinus betulus European hornbeam	20'	314	157	Deciduous.	
Umbellularia californica California laurel	20'	314	157	Evergreen.	
Magnolia grandiflora Southern magnolia	25'	491	246	Evergreen. Plant 'Majestic Beauty', 'Samuel Sommer' or 'St. Mary' varieties. May require pruning and staking.	
Ceratonia siliqua Carob tree	25'	491	246	Evergreen. Remove lower branches for canopy. Surface roots.	Male trees only. Use in large planters only.
Alnus cordata Italian alder	25'	491	246	Deciduous. Follow deep-watering practices for roots. Water well.	
Laurus nobilis Grecian laurel	20'	314	157	Evergreen.	



## SHADE TREES (Cont.)

[illegible]

# SCREEN TREES

Botanical Name Common Name	Approximate 15 Year Crown Diameter	Full Shade Area (sq. ft.)	1/2 Shade Area (sq. ft.)	Comments	Restrictions
Alnus cordata Italian alder	25'	491	246	Deciduous. Follow deep watering practices and water well. Rapid growth. Excellent selection. Plant 15' apart for dense screen.	
Liquidambar stryraciflua American sweet gum	20'	314	157	Deciduous. 'Burgundy', 'Festival' and 'Palo Alto' are good choices. Excellent fall color. Stake well and plant 10' apart for dense screen. Surface roots are problem but one of the best choices.	Use only in large planter.
Laurus nobilis Grecian laurel	20'	314	157	Evergreen. Give good drainage. Very good selection.	
Nyssa sylvatica Tupelo	15'	177	89	Deciduous. Good fall color. Plant 10'-15' apart for dense screen. Excellent choice.	
Pistacia chinensis Chinese pistache	25'	491	246	Deciduous. Stake young trees. Excellent fall color. Male trees best. Very good choice.	
Calocedrus decurrens Incense cedar	20'	314	157	Evergreen. Good choice.	
Pyrus calleryana Ornamental pear	25'	491	246	Deciduous. Use 'Bradford' variety. Watch for fireblight and insects.	

SCREEN TREES (Cont.)

Botanical Name Common Name	Approximate 15 Year Crown Diameter	Full Shade Area (sq. ft.)	1/2 Shade Area (sq. ft.)	Comments	Restrictions
Cupressocyparis leylandii Leyland cypress	20'	314	157	Evergreen. Rapid growth. Good choice.	
Sapium sebiferum Chinese tallow	30'	707	354	Deciduous. Excellent fall color. Stake young plants securely. Good choice.	
Liquidambar formosana Chinese sweet gum	20'	314	157	Deciduous. 'Afterglow' is good variety. Excellent fall color. Stake well and plant 10' apart for dense screen. Surface roots are problem, so give ample room.	Use only in large plantings
Pinus muricata Bishop pine	25'	491	246	Evergreen. Rapid growth.	
Pyrus kawakami Evergreen pear	15'	177	89	Evergreen. Stake until trunk is self-supporting. Watch for aphids and fireblight.	
Unbellularia californica California laurel	20'	314	157	Evergreen.	
Celtis sinensis Chinese hackberry	30'	707	354	Deciduous. Good in windy locations. Stake young trees.	



## SCREEN TREES (Cont.)

Botanical Name Common Name	Approximate 15 Year Crown Diameter	Full Shade Area (sq. ft.)	1/2 Shade Area (sq. ft.)	Comments	Restrictions
Carpinus betulus European hornbeam	20'	314	157	Deciduous.	
Pinus halepensis Alleppo pine	30'	707	354	Evergreen. Rapid growth. Pruning needed.	
Eucalyptus sideroxylon Red ironbark	25'	491	246	Evergreen. Select dense individuals. Rapid growth. Debris over pavement.	Use in large planters only.
Pinus thunbergiana Japanese black pine	30'	707	354	Evergreen. Easily pruned, tall tree. Rapid growth. Good choice.	
Tilia cordata Little leaf linden	20'	314	157	Deciduous. Stake and shape young trees. Will attract bees in summer. 'Greenspire' and 'Rancho' varieties are good.	
Prunus caroliniana Carolina laurel cherry	15'	177	89	Evergreen. Prune in tree form. Litter problem over paved areas but good choice.	Use in large planters only.
Cupressus glabra Arizona cypress	15'	177	89	Evergreen.	
Cocculus laurifolius	15'	177	89	Evergreen. Good choice.	
Thuja plicata Western red cedar	15'	177	89	Evergreen.	
Eucalyptus rudis Desert gum	25'	491	246	Evergreen. Debris problem over pavement.	Use in large planters only.

# LARGE SHRUBS

Botanical Name	
Common Name	Comments
Prunus laurocerasus English laurel	Evergreen. Tall (15-20') unclipped. Screen. Good choice.
Dodonaea viscosa 'purpurea' Purple hop bush	Evergreen. 12'-15' tall.
Ligustrum lucidum Glossy privet	Evergreen. Plant 10' apart for tall screen.

# MEDIUM-SIZED SHRUBS

Botanical Name	
Common Name	Comments
Xylosma congestum	Evergreen. 8'-10' tall, spreading shrub. Versatile. Excellent choice.
Photinia fraseri	Evergreen. To 10' tall. Prune to shape. Excellent choice.
Ilex cornuta Chinese holly	Evergreen. To 10' tall.
Cotoneaster lacteus	Evergreen. 6'-8' tall.
Ligustrum japonicum 'Texanum' Japanese privet	Evergreen. 6'-9'. Good choice.

# MEDIUM-SIZED SHRUBS (Cont.)

Botanical Name	
Common Name	Comments
Grevillea noellii	Evergreen. 4' tall.
Abelia grandiflora	Evergreen. To 8' tall
Glossy abelia	
Pittosporum tobira	Evergreen. 6'-15' tall.
Tobira	
Escallonia exoniensis	Evergreen. To 10' tall.
Escallonia rubra	Evergreen. 6'-15' tall.
Pittosporum tobira 'Wheeler's Dwarf' Tobira	Evergreen. Very dense 2' hedge.
Nandina domestica 'Compacta' Heavenly bamboo	Evergreen. Makes 4'-5' hedge.

## SMALL SHRUBS

Botanical Name	
Common Name	Comments
Raphiolepis varieties	Evergreen. Good choice.
Cistus varieties	Evergreen.
Rockrose	
Hypericum moseranum	Evergreen.
Gold flower	



GROUND COVER

Botanical Name	
Common Name	Comments
Trachelospermum jasminoides Star jasmine	Evergreen. Excellent choice.
Baccharis pilularis Dwarf chapparral broom	Evergreen. Prune once a year. Excellent choice.
Vinca minor Dwarf periwinkle	Evergreen. Good choice.
Cotoneaster dammeri Bearberry cotoneaster	Evergreen.
Gazania hybrids South African daisy	Perennials.
Hypericum calycinum Aaron's beard	Evergreen.
Hedera varieties Ivy	Evergreen. Good choice.
Potentilla Cinquefoil	Use evergreen perennial varieties.



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